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Radio Control CAR ACTION

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May 1993

THE WORLD'S LEADING R/C CAR MAGAZINE

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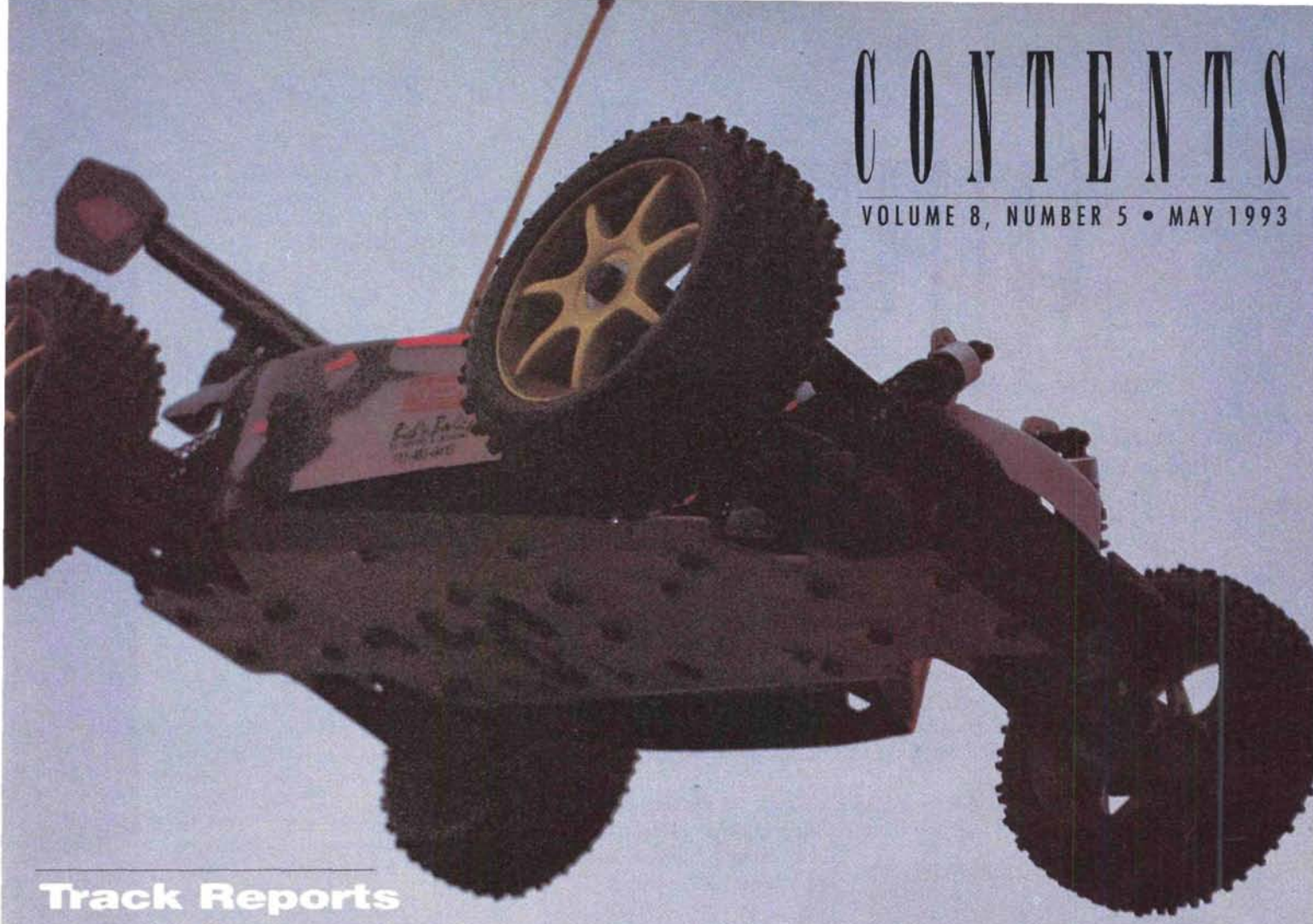

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On the cover: Traxxas Nitro Hawk. Paint by Motion Graphics. (Photos by A.R. Flatbush.)

EDITORIAL

"THERE'S NO WAY THAT CAR COULD WORK!"

I was standing trackside, waiting for my radio to be released from impound and wondering if my setup was right. My qualifying round was up next, and so far, I was a shoo-in for the A-Main—but things could change at any time. You learn this after you have a few racing seasons under your belt. Sure enough, the winning car from the previous round beat my time and bumped me into the B. I needed a look at it.

It was not a pretty sight. Parts of its body were clear; the rest had been painted an off-yellow that made my pupils shrink in an effort to spare my optic nerves from the strain. But that wasn't the worst part. The wing, which had once been clear Lexan, was opaque and smeared with the dirt of countless rollovers, and it was held together with strapping tape. Huge side dams made of old milk cartons were held on with pop-rivets.

I moved closer for further examination. "Check out the tires he's using," I said to Dyno Dan, my faithful racing sidekick. "I haven't seen that tread pattern in three years!" More inspection. The car's static suspension settings would have made Cliff Lett turn in his frequency clip for good. One front wheel had about 14 degrees of negative camber; the other had two degrees of positive. The front wheels had so much toe-in that I became convinced that if they both fell off the car at the same time, they'd collide with each other in exactly 8 inches.

Yet this car had just turned in a *very* fast qualifying time.

My curiosity was piqued. If you're not a racer, then I guess my perplexity must be confusing, but you have to understand that, by all logic, this car *couldn't* have gone as fast as it did. A look under the body seemed necessary. What the heck; the kid was out turn-marshaling anyway; he'd never know. One body clip, now the other. Careful yanking that wing off—don't want the owner to come back for his car only to find a pile of torn Lexan, tape and side dams.

One look under the body—so hideous it defies description—and I knew something was amiss with the autoscoring system, or maybe the kid had been allowed to run for 5 minutes instead of 4. Something. Maybe the kid was an incredibly talented driver—a closet Masami, if you will.

I looked at Dan, who was just about bursting. "Oh, did I say that was the winning car? Sorry, but I meant *that* one." And he pointed to the spotless Associated Team Car that was on the impound table next to the R/C Yugo I had been examining. Dan rode home in the cargo area of my Montero that night. He rides there a lot. ■

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SUBSCRIPTION PRICES:
U.S. & Possessions (including APO & FPO): 1 year (12 issues) $29.95; 2 years (24 issues) $54.95. Outside U.S.: 1 year $42.95; 2 years $80.95 Payment in U.S. funds.
Subscription Inquiries: 1-800-877-5169

RADIO CONTROL CAR ACTION (ISSN 0886-1609) is published monthly by Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897, USA. Connecticut Editorial and Business Office, 251 Danbury Rd., Wilton, CT 06897. Phone: 203-834-2900. FAX: 203-762-9803. Y.P. Johnson, President; G.E. DeFrancesco, Vice President; L.V. DeFrancesco, Secretary; Yvonne M. DeFrancesco, Treasurer. Second Class Postage Permit paid at Wilton, Connecticut, and additional Mailing Offices.

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MRC WORLD OFF-ROAD Scale™

NEWS

EDISON, NEW JERSEY—Model Rectifier Corporation (MRC) has just announced the release of its "World Scale Off-Road Rule Book," which was developed to be used exclusively in MRC World Scale off-road races.

The design and features of World Scale racing vehicles are breaking new ground, and the same open-minded, innovative thinking was behind the drafting of World Scale racing rules. The "old way" was thrown out, and a completely new Sport Class and Unlimited Class set of racing tasks and strategies was developed to allow both pedal-to-the-metal and out-of-the-box competitors to have their day in the sun.

Right out of the box, World Scale vehicles have ball diffs, slipper clutches, twin motors and oil-filled aluminum shocks, so there's no need to make extensive modifications to be competitive. By permitting only very limited modifications to the vehicles, World Scale racing's Sport Class promotes high-level racing skills. It will encourage the fiercest R/C competition, but it's based on drivers' *talents* rather than the thickness of their wallets. Newcomers to the circuit won't have to buy hundreds of dollars' worth of aftermarket accessories to avoid being laughed off the track (as is common in other so-called "stock" classes). Sport Class success depends on driving skill and strategy—period. And that's good racing by *anybody's* definition!

Now, if you want to play rough, the new rule book has a place for you, too. World Scale Unlimited Class means just that—*unlimited!* You can pull out all the stops and add as much extra equipment to your racer as you want. But, naturally, you'll face a field of drivers who have done just the same, so it's all fair.

World Scale Off-Road racing contests are offered at the local level, and they'll be complemented by many regional contests and a unique Scale World Championship.

World Scale rules promote top-level racing at a variety of levels of investment and, once again, MRC has demonstrated that World Scale is in a class by itself.

ADVERTISEMENT

LETTERS

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

CREDIT WHERE IT'S DUE

While reading your otherwise excellent coverage of the 1992 R/C Thunderdrome (March '93), I noticed a couple of errors in your winners' chart. In the stock classes, Bill Beauchemin (Sportsman) and Ed Allen (Expert) were listed as driving Trinity ReFlex chassis. Although the ReFlex is an excellent 2WD dirt-oval car, in fact, these two drivers were driving the Team Reflex Oval Advantage chassis.

R/C Reflex Technologies has been manufacturing and selling high-quality oval chassis conversion kits under the Team Reflex name since 1990. We first ran at the R/C Thunderdrome in '91 and were fortunate enough to place one of our Oval Advantage prototypes in the A-Main. In '92, we qualified at least one chassis in the A-Main at every major West-Coast oval event. Our chassis TQ'd in Expert stock at the August Thunderdrome warm-up race; we placed at least one chassis in every stock Main (Sportsman and Expert) at the '92 Thunderdrome, and we placed at least one chassis in every Main in every class at the Tekin Big Oval Shootout.

R/C Reflex Technologies is a very small company that exists for the benefit of the racer. I wanted to acknowledge the outstanding jobs done by Bill Beauchemin, Ed Allen and the other drivers—over 200—of our products. They're all "privateers" and we're very proud of the job they've done.

I'd also like to thank *R/C Car Action*, Futaba, Dan's RC Stuff, McAllister Racing and the other sponsors of Thunderdrome for putting on a tremendous show. I think I speak for all of our drivers in saying this was the most professionally run event I've ever attended. We're looking forward to the '93 event.

RICHARD CLEARY
President, R/C Reflex Technologies
Fountain Valley, CA

Thanks for writing, Richard. We apologize for the error, and we wish you and your company the best of luck. LA

SIREN SONG

For some time, I've been searching for a 1/10-scale ambulance body, but to no avail. As an R/C enthusiast and an EMT, I've always wanted an R/C ambulance.

I've seen R/C police cars and fire trucks, but no ambulances. I feel that there's an overwhelming demand by EMTs throughout the country for such an item. We have all the parts here in the U.S.; it's just a matter of bringing them all together. Your magazine is the catalyst we need. As a special feature, you could contact several of the companies needed to build an ambulance: a company like RAm to do the lighting, a Lexan body company and a good on-/off-road truck company for the chassis. The results of such a project would be of great interest to your readers. Also, I envision that someday, EMT squads will compete against others, and an R/C ambulance can be used to train future EMTs. Please, would you help?

ALBERT ABDEMUR
Roselle Park, NJ

Albert, Albert, Albert. Your question is fair enough; maybe there should be R/C ambulances for those who collect emergency vehicles. And yes, there are manufacturers in this country who probably could produce them. They're pretty busy these days, but we'll ask: how about it, manufacturers?

But—and this is important, so pay attention—you really lost us toward the end. You want to train EMTs with R/C? Setting up little highway accidents—we can see that. Racing your ambulance out

to your buddy's car when it flips over—fine. But actually training EMTs with R/C? How? Albert, do us a favor—don't move to Connecticut! As a matter of fact, we'd like the name of your EMT supervisor. Lives are at stake, here, man! DC

A SKIDMARK ON THE SHORTS OF LIFE

Your mag is tops. If it weren't for your magazine, I'd be completely lost.

I'd like to know if you're going to do a Track Report on the Tamiya Mountaineer. Among the cars I own is a Cox Turbo Scorpion, and the Mountaineer would be just the thing for pulling it around on a trailer. What d'ya think?

I noticed that Chris Chianelli is listed as an *Alleged* Editor. *I* love the work he's done with "Inside Scoop." Please promote him to an editor, get him a company car, buy him a beer, pin a medal on his chest....

Your January issue included a story about Jane McMillan (page 159). That's great! I showed it to my mom, who thinks R/C cars are a waste of time and money. Now I think she's coming around. She even asked me if she could look at the rest of your magazine. Ain't that grand?! Now if I could only get a transmitter into her hands.

By the way, what in the world is a "fish-wrap" rag?

"SKID" MARK JENRETTE
Honduras

Skidmark—(A note to our readers: if we're actually answering a letter from a guy named Skidmark, we must need more mail. Please, write to us!) If our magazine is, indeed, your life, you will know by the time you read this that the Mountaineer is a cosmetically updated version of the Bruiser. You will know this because we said so in a letter last month.

Mr. Chianelli is on his way to your house. So you buy him a car; you buy him a beer; you give him a pin.

Say, is your mom named Rita? Never mind.

And finally, if you don't know what a fish-wrap rag is, we won't tell you. DC

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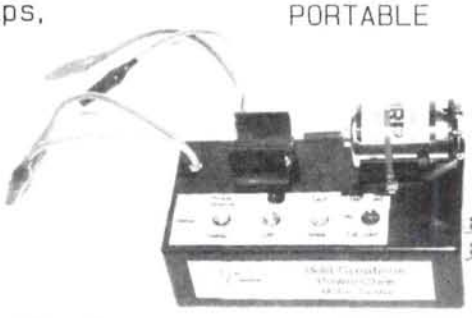

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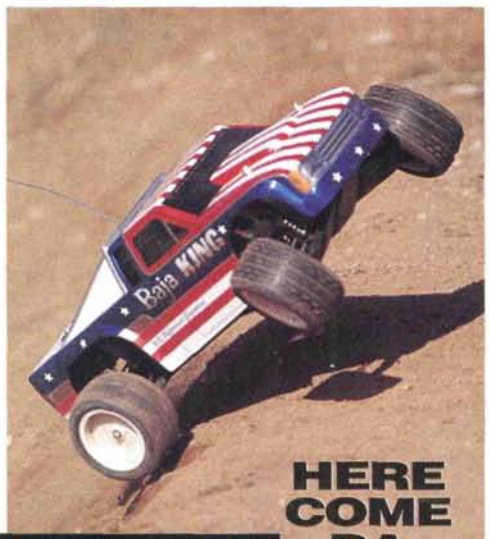
INSIDE SCOOP

by CHRIS CHIANELLI

IN SEARCH OF FUN AND GLORY, 'CAUSE LIFE'S TOO SHORT TO BE A SHEEP!



HERE COME DA KING

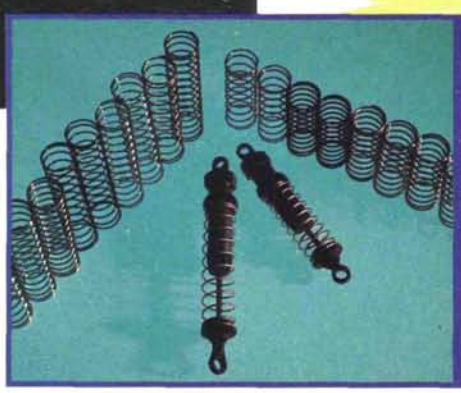
MRC's Baja King, which is the top of the line of the World Scale vehicles, is now available. This stadium-type race truck features a full set of ball bearings on the wheels and transmission, higher gearing than other World Scale vehicles, a low-profile racing truck body, easy-adjust turnbuckle tie rods and low-profile racing tires. For more more info, contact Model Rectifier Co., 200 Carter Dr., Edison, NJ 08818.

Feel the Beat

This is JR's new Beat Gear radio. The comfort-grip of the Beat Gear is very relaxing on the hands, even during prolonged use. This new radio features servo-reversing, a two-position throttle stick, a transmitter-charging jack and a BEC receiver. Pricing is reported to be very reasonable. Contact Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61820.

Moore Gas to Come

Mr. Eustace Moore Jr. and the entire MIP gang are geared up and "fully gassed" about the new popularity of 1/10- and 1/8-scale gas cars. Eustace says that 1993 should be a good year for gas cars and MIP. The MIP Gas Team is testing new products on cars that include the 1/10-scale Traxxas Nitro Hawk and the 1/8-scale M-1 Pirate. Watch for MIP's releases to hit the gas market this spring.



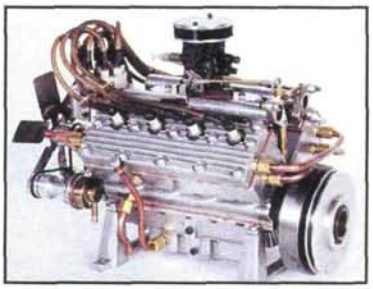
The Equalizer

The Equalizer is Kyosho's latest shock, and it features a Teflon-coated body and a two-piece cap that consists of a plastic mount and an anodized-aluminum nut. The plastic mount can pivot inside the nut, so there's no danger of the shock cap becoming unscrewed accidentally during a race. The aluminum nuts are rumored to be available in different colors to correspond with different-weight shock oils. The Equalizer's seals are designed to be compatible with silicone shock oil and won't swell when exposed to it, as others do. A unique rubber dust boot slides over the lower part of the shock body to act as a "wiper" for the shock shaft.

Detective Zingpot

Hobby Lobby's new Z.I.N.G.P.O.T. (part no. HLHS005) is a heat-sensitive tape (accurate to within ½ degree) that changes color as your batteries warm up during the charging process. If one cell is hotter than the others, it will show up as a different color than the rest of the pack, and—AH HAH! The culprit is exposed! This stuff comes in a pack of four for $9.90 and lasts indefinitely. By the way, Z.I.N.G.P.O.T. stands for "Zellen Ist No Guten Pointer Outen Tapen." Yeah, sure, good name guys. Personally, I'd have called the stuff Sherlock Holmes Tape. Anyway, I hear that this product really does what it's supposed to do, and it will certainly help you to keep track of the condition of your packs. For more info, contact Hobby Lobby Int'l Inc., 5614 Franklin Pike Cir., Brentwood, TN 37027; (615) 373-1444

Quarter-Scale Challenger



This 6.3ci, 90-degree, flat-head V8 engine is similar to a '53 Ford flat-head designed by Lancer Engineering in 1969; it's available from Custom Model and Machining. This water-cooled, spark-ignition miniature V8 runs on gasoline, produces 5hp at 6,000rpm and idles at 1,000rpm. The engine is made of aluminum, cast iron and bronze, and it includes sand-casted and bar-stock machined parts. The crankshaft, camshaft and valves are hardened to Rockwell 62-C spec. It's 12 inches long, 7 inches wide and 8 inches high. For more information, contact Custom Models and Machining, 20805 SW 90, Tualatin, OR 97062.

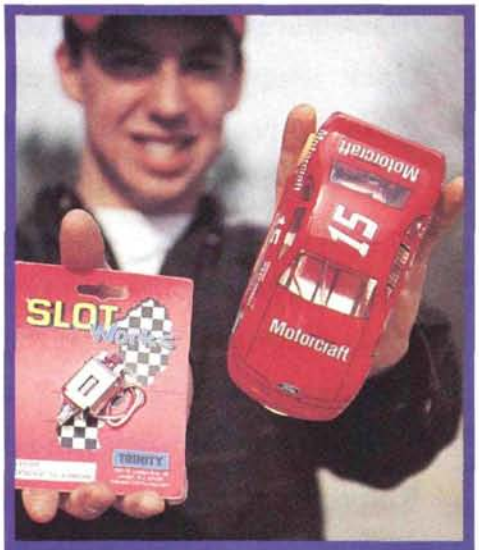
KYOSHO-AMERICANA CHASSIS

Dan Moynihan of Dan's RC Stuff is holding his new—and ingenious, I might add—Americana Chassis for the Kyosho Nitro T-Bird and ZR-1. This chassis mates with all the components of the Kyosho ⅛-scale gas car aft of the front suspension while allowing the use of the Associated 10L front suspension. This great-handling combination lowers the car, allows the use of American wheels and tires and, best of all, allows easy mounting of all American ⅛-scale bodies—include the much-loved stock-car favorites. The Kyosho-Americana chassis has a very low suggested price of under $40. For more info, contact Dan's RC Stuff, 9525 Cozycroft Ave., #C Chatsworth, CA 91311; (818) 700-6912; fax (818) 700-2940.

HOOK UP HOT

If you don't have the right off-road tires, you're gonna be hatin' it, my friend! Avatar Racing Performance has just released its H.O.T. Shoes line of ⅛-scale off-road tires in the U.S., and from the looks of things, these tires should have little trouble "hooking-up" on just about any dirt surface. As of this writing, Avatar's tire lineup includes a multi-ribbed front tire for 2WD cars that run on medium to hard dirt and its large, two-layer-spike rear tires for soft dirt and clay surfaces. Also, H.O.T. Shoes offers several versions of mini- and micro-spike rear tires for use on hard-packed dirt.

Contact Avatar Racing Performance, P.O. Box 1277, Mississauga, B Station, Ontario, Canada L4W 2G4.



BACK TO HIS ROOTS

The name Trinity is well known to R/C car consumers. What some of you may not know is that it first appeared in the slot-racing world years ago. With the recent surge in slot-racing popularity, Trinity has decided to get back into the market with its new Pro Design Spyder™ chassis. It's available RTR with balanced and unbalanced 16-D motors, and also with a Champion Force X-12 motor and air dams. Send an SASE for the latest Slot Works catalogue to Slot Works/Trinity, 1901 E. Linden Ave #8, Linden, NJ 07036; (908) 862-1705.

Brushless Motor Coming to our Hobby?

Aveox presents technology that has the potential to change electric-powered racing forever: brushless DC motors. In today's typical motor, the magnets are mounted on the case, while the windings are on the armature. As the motor spins, brushes rub on the commutator plates, switching the polarity of the armature coils. This is often called a "moving coil design." (See Figure 1.) The brushless motor is sort of like a brush motor turned inside out. (See Figure 2.) A shaft with a permanent magnet is mounted on two ball bearings, and the windings are fixed to the case. The polarity of the windings is electronically switched to keep the magnet shaft spinning. Brushless motors are nothing new, but Aveox seems to have developed electronic switching that's fast enough to attain the necessary rpm for our hobby. The advantages of a brushless motor are longevity (no brush or commutator surface to wear) and no brush arcing, which can be a source of interference. These motors could also increase efficiency and run time. We'll keep you posted. The retail price will be approximately $400, including speed controller. For more information, contact Aveox Inc., P.O. Box 1287, Agoura Hills, CA 91376; (818) 597-8915; fax (818) 707 9792.

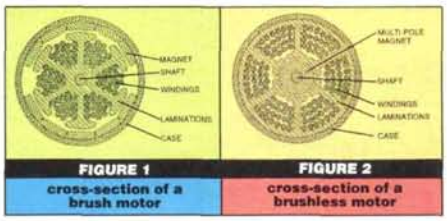
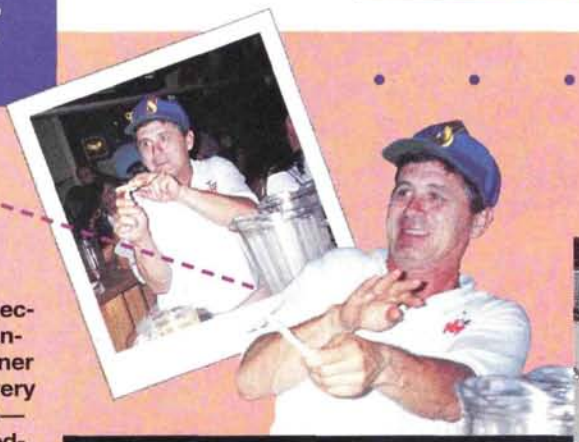


FIGURE 1 cross-section of a brush motor

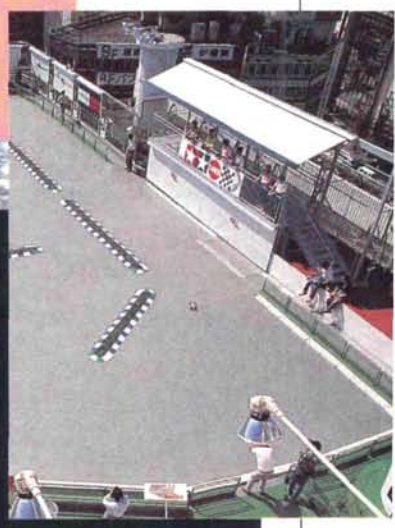
FIGURE 2 cross-section of a brushless motor

Novak Attack



It's a well-known fact that electronic wizard and speed-controller guru Bob Novak, owner of Novak Electronics, is a very serious and dedicated man—most of the time. When his products make a strong showing at a major race, however, he has an overwhelming urge to start a food fight. Lately, his ability to overcome this urge has failed at an increasing rate. We at *Car Action* have been aware of Mr. Novak's darker side, but could not, in good conscience, report on it without proof. Well, now we have some, and here it is.

Racing in Cloud 9



Because Japan is so small, the Japanese have become experts at creative space use. Pictured here is a commercial, rooftop, on-road race track high up on an urban high-rise building. Think of it—racing 30 or 40 stories up, closer to the clean air and the clouds, away from the noise and the smog. The Japanese race-rule supplement for rooftop racing requires that all cars and over-eager turn marshals be equipped with parachutes.

SCOPING OUT

Hitec SP-1840

by JOHN RIST

IMITATION is the best form of flattery; so it was only a matter of time till other speed-controller manufacturers would follow Novak and Tekin with their own version of a high-frequency (HF) ESC. If you've ever used an HF controller, you've experienced smooth throttle response (especially in the lower speed ranges), longer run times and cooler motor operation. Hitec*—known for its no-frills, low-cost approach to R/C hobby products—has plunged headlong into this market with the SP-1840. With this in mind, I was anxious to take a look at this offering to see where it fits into our great hobby.

It's always fun to get a package in the mail, so I ripped it open. A close inspection revealed that the SP-1840 was a racing-style controller with the following features:

- 5 FETs for forward, 1 FET for brakes
- High-frequency motor control
- Two built-in adjustment pots—one for neutral, the other for full speed
- 5- to 7-cell capacity
- BEC
- Overheating protection via Tempfet
- On/off switch
- Factory-installed Tamiya-style battery connectors and bullet-style motor connectors
- Can be mounted in place of a standard servo via servo-style mounting tabs
- Comes with small instruction sheet and a great adjustment screwdriver

After I inspect the outside of an ESC, I always open the controller to make sure that the innards are rugged enough to withstand the rough-and-tumble lifestyle of R/C car drivers. The case snaps together, and it must be opened with care. I managed to depress the locking tabs (two on each side) with a jewelers' screwdriver, and the case opened without breaking off a tab.

The SP-1840 is built with conventional-looking parts mounted on two printed circuit boards (PCB). One PCB contains all the high-power components, e.g., the FETs and the motor and battery wires. This PCB is mounted at a right angle to the main PCB. This right-angle arrangement allows the FETs to protrude from the side of the case rather than from the top, giving the SP-1840 its servo-like profile. Hitec then added servo-style mounting tabs to the case, making this ESC a bolt-in replacement for a throttle servo.

Looks are nice, but it's the performance of an ESC that makes it good or bad. So I headed to the Scoping Out Lab to scope out what kind of performance could be expected from the SP-1840.

VOLTAGE-DROP TEST

With 12 amps of current flowing, the voltage drop along the length of the wire turned out to be 0.33 volt. This gives an "on" resistance of 0.0275 ohm. Two inches along the wire, I measured a 0.13V drop, which yields a resistance of 0.0108 ohm. This places the SP-1840 in the same class with some of the other sport-style HF controllers that I've tested. But at the Hitec's bargain prices, the SP-1840 is well worth a look.

Another thing that I noticed was that there is a 2.5 to 1 difference in the end-to-end resistance and the 2-inch resistance. What this means is that the factory-installed connectors and the size of the wires on the SP-1840 are robbing lots of power. If you plan to race with this controller, you can cut the "on" resistance nearly in half by installing good-quality racing-style connectors and by keeping the wires as short as possible.

Another trick that you can pull with this controller is to replace the white battery-to-motor wire with red 13AWG monster wire. This is possible because Hitec has crimped the red controller-to-battery wire and the white battery-to-motor wire into the positive contact of the battery connector. If you replace this connector, you can replace the motor-to-battery wire at the same time.

I like to hard-wire my motors directly to eliminate the motor connectors, and I use a good, low-loss connector for the battery. This provides a hot setup, but I can still change batteries without a hot soldering iron. On a three-wire controller such as this one, I place a piece of red monster wire in the positive contact of my battery connector. I then run this wire to the positive terminal of the motor. I keep this wire

Hitec SP-1840

DIMENSIONS:
Height (with heat sink) ..... 0.81 inches
Width (less servo tabs) ..... 1.62 inches
Length (with heat sink) ..... 1.75 inches
Weight (with wires and heat sink) ..... 2.1 ounces

TUNING:
Access to controls ..... Excellent
Ease of adjustment .... Difficult (no pulse-checking LED)

PRICE:
Suggested retail $99.95
Warranty ..... None listed

ELECTRICAL: (Manufacturer's specs)
Max. number of cells 7
Min. number of cells 5
Max. current ..... 800 amps
Continuous current ..... 175 amps
Resistance ..... 0.0056 ohm

TEST PARAMETERS:
Voltage ..... 6 volts
Current ..... 12 amps

TEST RESULTS:
Voltage drop along length of wire ..... 0.33 volt
Voltage drop 2 inches along wire ..... 0.13 volt
Resistance to end of wire ..... 0.027 ohm
Resistance 2 inches along wire ..... 0.011 ohm
BEC output, 6-cell battery ..... 5.48 volts

COMMENTS:
The SP-1840's instruction sheet is virtually nonexistent, and there is no built-in pulse-checking LED. The controller does have a full set of factory-installed connectors, which makes installation a snap and renders the lack of instructions "no big deal." With a little tinkering, it's possible to adjust the controller properly without a pulse-checking LED. The SP-1840 is a true high-frequency motor-drive speed controller. If you've ever experienced the pleasure of using a high-frequency controller, you know how smoothly one drives. The SP-1840 has plenty of muscle to compete in most stock-class roadcourse races, and its smoothness could well be a secret weapon that permits you to outrun the unfortunate ones who are still driving conventional speed controllers.

as short as possible and make sure that I have good solder joints. I remove about ½ inch of insulation from this battery-to-motor wire at its midpoint and splice in the red wire from the controller. Next, I connect the black wire from the controller to the negative contact of the battery connector, and I connect the blue wire from the controller to the motor's negative terminal. It appears that on the SP-1840, it's necessary to extend the blue motor wire by splicing in a length of wire. Don't forget to cover all the splices with shrink-tubing. A dead-shorted battery or motor lead can cause serious damage to the ESC and/or battery.

LET-IT-COOK TEST

Anyway, I digress. For this test, I install the heat sinks, but I don't provide any cooling air from a fan. After 15 minutes at 20 amps, the SP-1840 was too hot to comfortably touch, but it was still within safe operating limits. Given the SP-1840's "on" resistance it was about what I had expected.

DEAD-SHORT TEST

With the SP-1840 running wide open, I placed a dead short across the motor leads. The current jumped up to 40 amps—the limit of my lab supply. I let the controller struggle along in this mode for 1 minute. Before a minute had passed, I saw a little smoke rising, and I began to wonder if the SP-1840 would make the full minute. It did, though, and it still operated normally. It turns out that the smoke probably came from the Tamiya-style battery connector. As I've already said, if you plan to race this controller, replace or eliminate the connectors.

I checked the heat sink and again found it too hot to touch, but the controller was still within safe operating limits. The SP-1840 appears to be fairly tough, but no controller is completely idiot-proof; if your car seems to be having problems, stop to check it out!

SET IT UP

I set out to install the SP-1840 in my Kyosho Sideways. The first step in any installation process is to read the instructions, which, in this case took all of about 30 seconds. They're written on two sides of a 5x7-inch sheet. I hope that a picture is worth a thousand words, because all there is under the heading "Connection" is a picture of the hookup! The motor capacitors aren't mentioned in the instructions, and they aren't included in the accessory kit. The picture does depict the type of motor that has built-in capacitors, but most of the hot motors that we hot-rodders like to use don't have the caps installed. With high-frequency speed controllers, I use three .1-microfarad capacitors (the small ones). I solder one between each of the motor terminals (positive and negative) and the motor case, and I put the third between the two motor terminals.

The other nice touch in the instruction sheet is the warning that the "propeller may start to turn" when the switch is turned on. I guess you could use this controller in an airplane, but, for my taste, I'll watch out for turning wheels!

The actual installation was quite easy. My Kyosho Sideways still has all of the standard connectors on board (I don't race it), so it was a simple matter to mount the SP-1840 with servo-mounting tape and plug in the wires. I could have mounted the SP-1840 by its servo-style mounting tabs, but it has been eons since my Sideways has had a mechanical ESC, and I have long ago

"SCOPING OUT" LAB AND TESTS

THE LAB consists of:
- an oscilloscope
- a digital voltmeter
- a variable-load resistor bank
- a 6V 30A electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5W power resistors that can be switched on and off one at a time to vary the load between.6 amps and 20 amps, but the standard 12 amps are usually used.

In series with the resistors is a 25A Simpson current meter and a 1-percent 0.01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

• **VOLTAGE-DROP TESTS.** These are the first tests. It's virtually impossible to read an ESC's resistance directly, so I measure the voltage drop across it with the resistor bank set up for 12 amps of current. I then calculate the controller's "on" resistance by dividing the measured voltage drop by 12 amps. I take the voltage reading twice: along the full length of the battery and motor wires (including connectors) and 2 inches along them. The first reading helps me to determine an ESC's "on" resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs.

• **LET-IT-COOK TEST.** I adjust the resistor bank to pass 20 amps of current, then I jam the throttle wide open and let the ESC pump the 20 amps.

• **DEAD-SHORT TEST.** With this test, I check whether the controller can survive the heavy current caused by a jammed gear or a fried motor. No one likes to have this kind of trouble and discover that his ESC has been destroyed, too.

lost the servo-mounting hardware.

With the battery charged, it was time to adjust the SP-1840 to my transmitter. The good news is that the supplied screwdriver is one of the best in the industry. It even has a clip to mount it on the transmitter antenna. The bad news is that the instruction sheet doesn't even *hint* how you should set the controls, and the SP-1840 doesn't have a built-in pulse-checker. The transmitter settings that worked best for me were as follows: throttle-reversing switch set to reverse; throttle trim set to its midpoint; throttle end-point adjustments (ATV) set to maximum (not all transmitters have this adjustment).

The real heartburn was what to do about the lack of a built-in pulse-checking LED. The neutral point was easy to set because you can adjust the pot until the motor starts to turn, then back it off slightly. The real problem is setting full speed. As the instruction sheet puts it, "Adjust the volume so that full speed is realized at the position of throttle stick the user desires." I like my trigger to reach full throttle at about the 80-percent point, so I pressed the trigger to this point and adjusted the full-speed pot while I listened for maximum motor speed. I then played with the trigger to see if the feel of the trigger and the sound of the motor seemed right. I double-checked the adjustment with my oscilloscope, and it was set up right on the nose. If you have a good voltmeter, you can also check for full throttle by looking for maximum voltage at the motor terminals.

ROAD TEST

With the controller set up and working, I released the car on a dead-end street. It was obvious that this was truly a high-frequency motor-drive controller. The throttle response was as smooth as silk, especially at the slower speeds. The braking action was about average, but strong enough to force sliding 180-degree turns. I didn't check it all that closely, but run times seemed to be quite good.

When I test drive a new ESC, I always drive far down the street to check my transmitting range. The SP-1840 was solid as a rock for as far away as I sent the car. I then drove a battery until it dumped and found that the SP-1840 had no tendency toward low-battery runaway.

So, what we seem to have here is a budget-priced, no-frills, high-frequency ESC. If you're still trying to keep that pesky mechanical speed controller running, you might want to replace it with the SP-1840; it's the same size and shape as a

(Continued on page 98)

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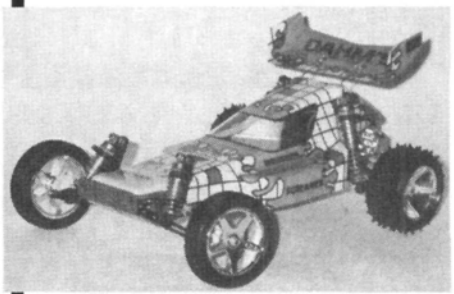

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Making creative cockpits

HOW TO DETAIL CONCOURS INTERIORS

by MIKE OGLE

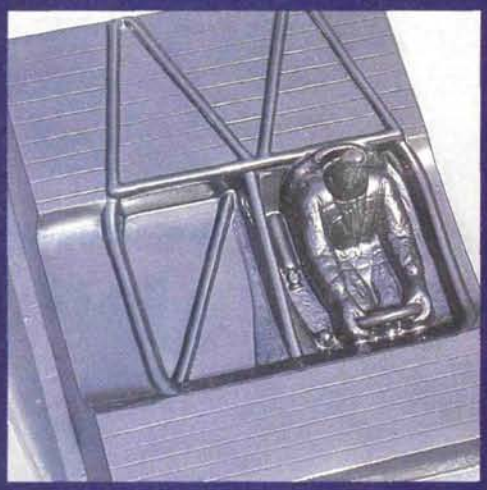
PHOTOS BY MIKE OGLE

Various shots of the completed interiors. Other details include a "DieHard" sticker on the battery box (GTP car), small cut-out pieces of chrome MonoKote stuck in place for belt buckles, silver spokes in the steering wheel, and elastic cuffs drawn onto the driver's suits with a fine-tip black Sharpie.

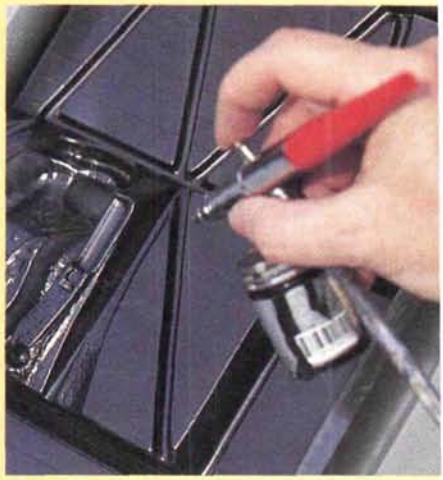
ONE SURE WAY to win points in concours judging is to equip your car with a detailed driver figure and interior. These small touches have decided many competitions. Taking home a concours trophy can make you feel pretty good, even on the lousiest day of racing. If you're a racing purist who doesn't want to haul around the weight of a full interior, don't worry: most of the time, you can remove the interior if you're racing with the same body. So, you've got no excuse! You don't have to be an art major to do these detailing tricks, so let's get out those little Lexan guys and get busy—it's easy!

CHOOSING A DRIVER/INTERIOR FOR YOUR CAR

If you want to detail a full-bodied car's interior, you have a couple of options. You can make a interior from sheet Lexan and a "head-and-shoulders" molded driver figure (like those that come with many off-road cars), or you can take the easy way—like I did—

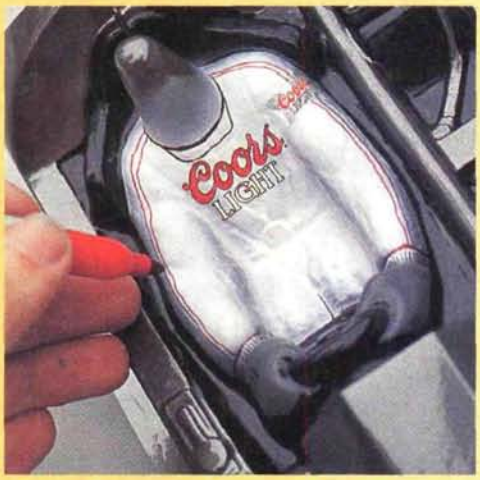


1. *These interiors from McAllister Racing are for full-bodied stock cars and GTP style cars. Both have a lot of good detail.*

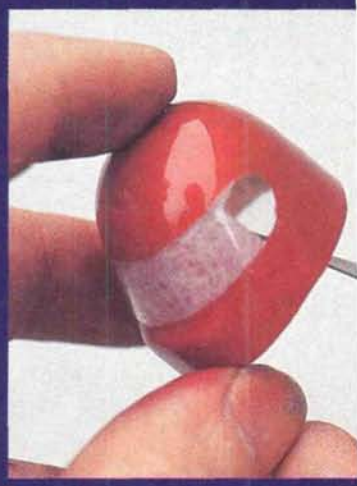


2. *The first step: spray the interio basic dark color. I used a meta dark gray.*

6. *Fine-point Sharpie markers are great for small detail work.*



7. *Use a colored Sharpie to put racing stripes down the arms of your driver.*



8. *Mask off the clear "visor" area of the helmet, and spray the color inside for a high-gloss finish.*

and use McAllister Racing's* good-looking, two-piece, vacu-formed interior. It has everything you'd want molded right in: a driver with full safety belts, a dashboard with gauges, a steering wheel, a fire extinguisher and a lot of roll-cage-type bracing. What's the second piece, you ask? It's the driver's head. Well, actually, it's his helmet, and because it's a separate piece, you can do some pretty neat tricks with it (more on this later).

Gary McAllister, a concours expert himself, hasn't forgotten you on-road racers, either. His GTP interior is more compact—to fit the smaller confines of most GTP-style cars—but it's packed with details such as a second fire extinguisher and a battery case.

Associated*, Bolink* and Parma* offer a number of driver figures for off-road cars and trucks. Space is usually tight in an off-road car body, so they usually don't include very much in the way of detail besides just the driver.

My favorite driver figure is the molded polystyrene one that comes in the Tamiya* and new Kyosho* Formula 1 car kits. The driver's "head" is, again, not molded in with the body, and its two-piece construction gives it a much more realistic shape, like that of a full-coverage wraparound helmet.

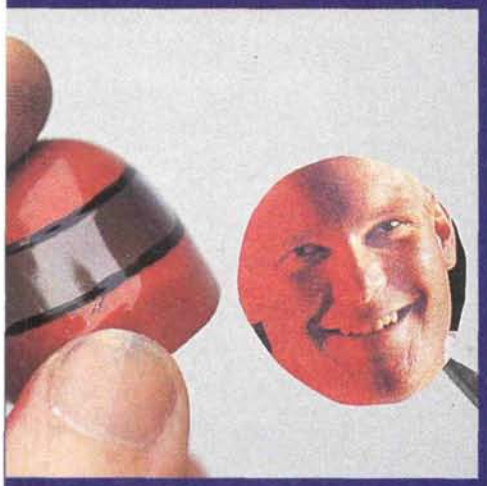
9. *Small hair ribbons, available in drugstores, make great-looking seat belts. Just glue them right over the molded-in belts as shown.*

10. *You can paint the roll-cage tubing, or cover it with strips of MonoKote that match the car's color scheme.*

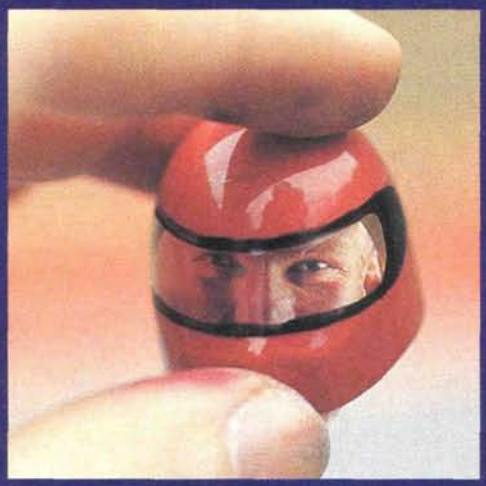
3. *For a flat, fabric-like finish, spray the driver's suit on the outside.*

4. *If you use a fine pattern on your airbrush, you can get this "shaded" effect.*

5. *Decals on the driver's suit will simulate sponsor patches. All the drivers have them!*



Get a photo of yourself (or, in this case, a world-champion driver) and cut out just the face as shown here.



Curl the photo slightly and glue it into the helmet. It looks better if it isn't flush against the clear visor. You OK in there, Joel?

Of course, you don't have to use just pictures of men. After snipping away all the really interesting parts of the photo, this major babe became my choice for a driver.

11. *A Pilot silver marker with an extra fine-point makes perfect little round silver rivets. Just touch it to the surface, and lift it up. Instant rivets!*

CHOOSING THE INTERIOR COLOR

Let's start by spraying the interior a basic color. The easiest choice, as you've probably guessed, is to spray the underneath black and then highlight the details with other colors. That's OK, but if you choose a charcoal silver or a gunmetal gray, then you can use black as one of your detailing colors, and the lighter colors won't just turn into a hard-to-see (and hard to judge) black "pit" inside the car. I like to mix a 50/50 blend of silver and black for the basic color; it simulates raw sheet metal or composites commonly found inside full-size race cars. In Richard Petty's last race cars, the crew painted the interior sheet metal medium gray. Why? To make it easier to work inside the car in dim light, and to be able to spot oil leaks and such more easily. Pretty clever!

PAINTING THE DRIVER'S SUIT

Next, let's paint the driver's fire-resistant suit. In the old days, these Nomex suits came mostly in white, but in these days of high-dollar corporate sponsorships, the drivers' suits often match the race car's color scheme. Today's suits come in all colors, from Budweiser red to Pennzoil yellow to Quaker State green. So just choose a color that corresponds to your car's basic scheme, and it will look great.

If you have an airbrush, mask off the driver's cockpit and carefully spray the driver's suit from the outside. We're going for a "flat" finish here—more like fabric. Don't worry about covering all the way down the sides of the driver's arms: if you allow the color to softly fade out on these surfaces, it will add a nice 3-D shaded effect. (Check out the

(Continued on page 23)

INTERIOR DETAILING

photos to see what I mean.) Clean any overspray with a cotton swab and denatured alcohol. If you don't have an airbrush, take a fine-tipped paintbrush and brush on several coats on the outside. It will probably take several coats to hide the dark interior color, especially if you're painting the suit a light color like yellow or white.

When that has completely dried, you can add decals to the driver's suit to simulate sponsors' patches. Most suits will sport at least a dozen different patches on the upper body, shoulders and arms. Of course, when the driver is strapped in, the seat belts will cover up a lot of the area where patches would normally be displayed, but if you can fit on even a few, it will look more realistic than a "plain" suit.

The driver's gloves are also usually made of a fireproof material, and they can be almost any color, but they usually have a dark-colored leather surface for gripping the steering wheel. As a final touch, take a fine-point black Sharpie permanent marker and add suit details such as buttons, pocket flaps and cuffs. With a colored Sharpie, you can also add stripes like those commonly found down the sides of the driver's arms.

NOW FOR THE HELMET...

The driver's helmet can be almost any color, and it can feature paint schemes as elaborate as the race car itself. It seems as though American race car drivers, such as those in NASCAR or NHRA drag racing, favor helmets that have been painted to match their cars, while European drivers prefer highly individual helmets that become their trademark. Look at the Formula 1 guys and you'll see what I mean. Pick your colors, mask off the helmet's clear "visor" area, and this time, we'll paint the inside of the helmet so it has a high-gloss finish. More sponsor decals on the outside of the helmet would be appropriate here, too!

Now what do you do about that clear visor area? You can't leave it clear, or all you'll see in there is the conehead neck stub—not very scale. You have a few options, the easiest of which is to paint the visor black, or tint it very nearly black (like a shaded visor used for bright daytime racing). You could also apply a piece of chrome MonoKote* to the visor to simulate a reflective visor. Or, you could do something really bizarre: find a photo of yourself where your face is about 1 inch high. Carefully cut out your head from the photo, and curling it slightly, glue it to the inside of the helmet so you're looking out the front! The effect is really unbelievable. Of course, the photo doesn't have to be of *your* face—it can be your brother, your girlfriend, your dog, or Miss February (uhh...just the face, now!).

Finally, you can paint the seat belts, or if you really want to add a realistic touch, glue ¼-inch-wide hair ribbons onto the molded seat belt areas. These look great, and they're an inexpensive detail that you can find at almost any drugstore.

DETAILING THE INTERIOR

Now that we're done with the driver, let's take a look at the interior details. If you're doing a NASCAR-style interior, one of the main features is the frame/roll-cage tubing. In full-size cars, it's frequently painted the same color as the body. An easy way to detail this is to put 1/4- to 3/8-inch strips of colored MonoKote or Coverite* striping tape on the outside of each bar. The tape covers well and makes a nice, even edge that would be almost impossible to paint by hand.

The molded-in fire extinguishers can be painted red or yellow, and a "Simpson" (or other safety-equipment manufacturer) decal will add a nice touch. The steering wheel rim is usually flat black (foam rubber), and the spokes of the steering wheel can be painted silver. When they've dried, use your black Sharpie to add details such as lightening holes. The dash's gauges can be detailed with a very fine brush and some silver paint.

As a final touch, go to a stationery store and get a Pilot silver marker with an extra-fine point. With just one touch, these make perfectly round silver "rivets," and you can put them all over the interior in neat little rows to simulate riveted sheet-metal joints. These markers, also available in gold, are perfect for small details, but aren't really durable enough to be used on the outside of the car body.

MOUNTING IT UP

Now that you've got this killer interior, you probably don't want to race with it, so don't glue or servo-tape it in. Instead, use strips of Velcro® to secure it inside the body. This way, you can put it in for the concours judging, and slip it out before qualifying begins. You can use the same interior with any of your racing bodies, in case—like most of us—you go through a few bodies a season. So, take your time, and you'll have an interior that you can be proud of—and a few concours trophies, too!

**Here are the addresses of the manufacturers mentioned in this article:*
***McAllister Racing,** 1000 N. Humphreys St., Ste. 204, Flagstaff, AZ 86001.*
***Associated Electrics,** 3585 Cadillac Ave., Costa Mesa, CA 92626.*
***Bolink R/C Cars,** 420 Hosea Rd., Lawrenceville, GA 30245.*
***Parma International,** 13927 Progress Pkwy., North Royalton, OH 44133.*
***Tamiya America,** 101 Columbia, Aliso Viejo, CA 92656.*
***Kyosho/Great Planes Model Distributors,** P.O. Box 4021, Champaign, IL 61824.*
***MonoKote;** distributed by Great Planes.*
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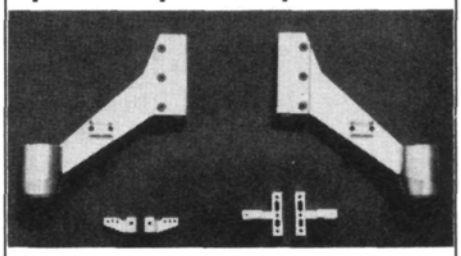

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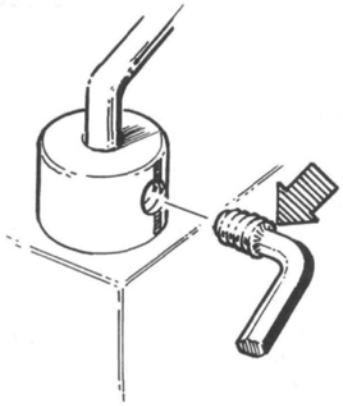
PIT TIPS

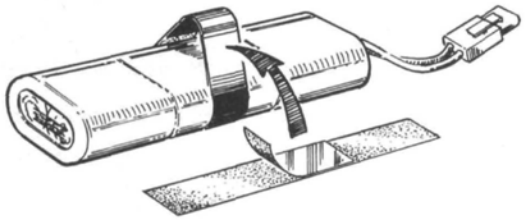
by JIM NEWMAN



QUICK-DETACH WING MOUNTS

To make your wings easy to detach, cut Allen keys very short and solder them to the setscrews that hold the wings. To remove them, a quick twist is all that's required.

Chris Baker, Stockton, CA

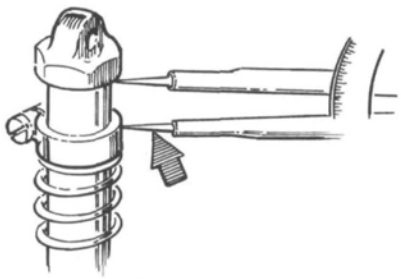


NI-CD REMOVAL HANDLE

Stick two pieces of vinyl electrical tape face to face, as shown here, then wrap the strip around a Ni-Cd pack. Now you have a convenient handle on which to tug, instead of pulling on the wires. *Brent Baxter, Hastings, MN*

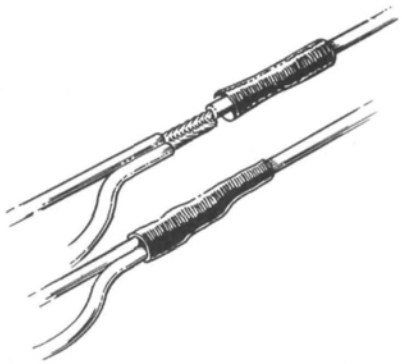
CAR BODY PROTECTION

To protect your car's body from stone damage, apply black vinyl tape to its edges. *George Rudgers, Wappingers Falls, NY*



SHOCK SPACER CHECKING

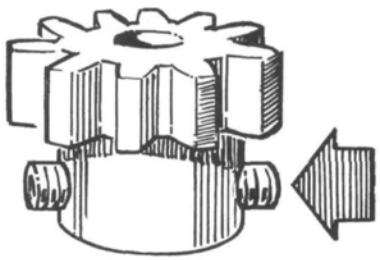
To check that the spacer setting is the same on each side of the car, use a set of draftman's dividers. *Jeff Mosing, Lafayette, LA*



NEATER WIRE SPLICE

When using three-wire ESCs, many people splice a separate battery-positive wire into the controller's single red positive wire (which is usually connected to the motor). To do this, strip the insulation from the ESC's red wire and solder the separate red lead to it—not at a 90-degree angle, but parallel, because there's more wire area to hold the solder joint together.

Brian Wamsley, Lancaster, CA

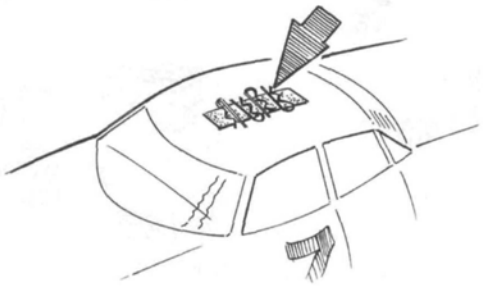


STOP SPUN PINIONS

Drill and tap your pinion to accept a second setscrew opposite from the existing one. With two setscrews securely tightened on the shaft, spun pinions are a thing of the past.

Stan Kokoszka, Cheektowaga, NY

PLEASE NOTE: be sure to print your name and full address clearly on every letter and sketch you send to "Pit Tips." We have to throw away many good tips because we don't have the senders' names or addresses.



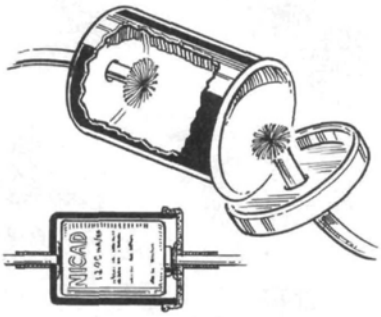
BODY-CLIP PARKING

Use double-stick tape to stick a small rectangle of magnetic material on the roof of your car. When you remove the body, you can safely park the body clips on the magnet, and they won't get lost.

Brian Milkovich, Scarborough, Ontario, Canada

TIDY WIRING

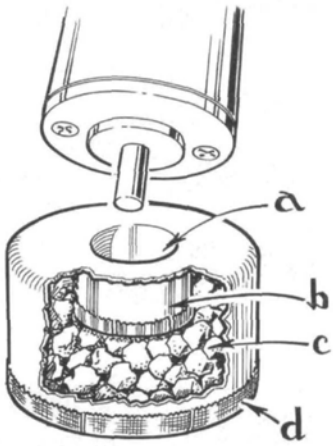
Use tie-wraps to keep your wiring neat. It's better than tape and easier to remove. *Tony Agapiou, Van Nuys, CA*



BREAK-IN NI-CD HOLDER

Drill holes in the end of a 35mm film canister and its lid. Insert the motor lead wires, fan out the ends and apply a little solder to make contact pads. When you insert the Ni-Cd and snap the lid into place, the leads will make efficient contact with the Ni-Cd, which can be rapidly changed for a freshly charged replacement if needed. Be sure to observe correct cell polarity.

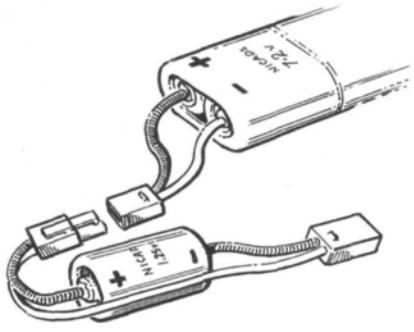
Kit Roberts, Palmer, AK



MOTOR STAND

Cut a hole (a) the size of your motor's bearing housing in the top of an aerosol can lid. Cover the end of the lid's inner ring (b) with duct tape and fill the rest of the lid with mortar, or small stones (c). Finally, apply tape (d) to the open end of the lid, and you'll have a convenient weighted motor stand.

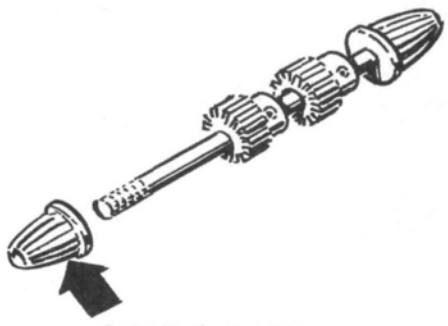
Jesse Moore, Jacksonville, OR



ADD A SEVENTH CELL

Wire a single Ni-Cd cell as shown, i.e., with the appropriate plugs and sockets. Now, if you need to add a seventh cell to your pack, all you have to do is plug in the extra one.

Dan Lennon, Schenectady, NY



GEAR CADDY

Screw a no. 16 wire nut (used to join wires in house wiring) onto each end of a short piece of no. 16 electrical wire. You can slip your spare pinion gears onto the wire and hold them with the nuts. *Wallace Logan, Mt. Vernon, WA*

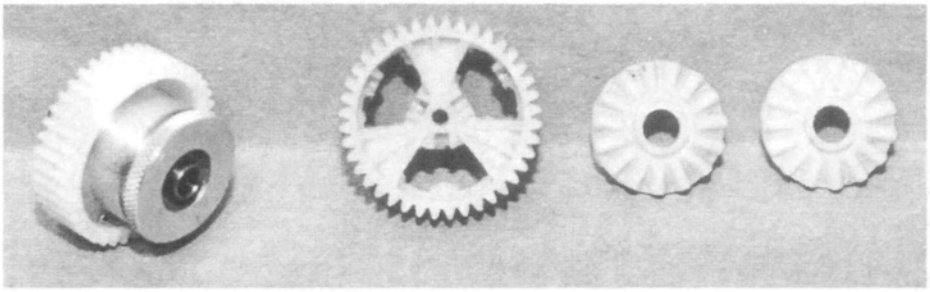
Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o **Radio Control Car Action,** 251 Danbury Rd. Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

TRUCK STOP

DIFF DIGEST

by JOE LEFFELMAN

DIFFERENTIALS, which can improve a car or truck's performance, have been around for some time now. There are aftermarket diffs available for most R/C cars, but until now, there wasn't one for the Clod Buster. The good people at Thorp Mfg.* have changed that. All of us who own Clods know that handling them can be a chore, especially when it comes to racing those big rigs on a tight course. Thorp's Clod diff was designed to help in those situations—turning into and coming out of turns. I once had a Thorp diff in a Blackfoot, and it was great. Could this be a repeat?



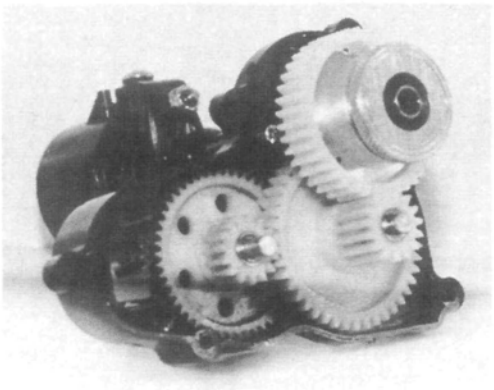
The new Thorp Clod Buster ball differential (left), replaces the stock gear diff assembly on the right. With the new diff, your Clod can maneuver around tight obstacles more easily.

INSTALLATION

Installing the ball diff is simple but time-consuming. Completely disconnect the gear case from the chassis. Leave the axles on the case, but remove the wheels. Then remove the six screws that hold the gear case halves together. Hold the gear case in both hands with the motor facing away from you, and gently separate the halves. With any luck, the half in your right hand will contain all the gears. If it doesn't, just return the gears to where they belong. Remove the large differential spur gear, the six small bevel gears and the two large bevel gears. (That assembly should come out in one piece.) Next to the two large bevel gears, there's a brass bevel joint that's splined on the inside. It slides over the drive shaft. Keep it; you'll need it later.

With those gears out, inspect the remaining ones for cracks and broken or chipped teeth, and clean them, if necessary. Check your bushings or bearings and oil them if they need it. Then apply some molybdenum grease to the teeth of the two counter gears and to the counter shafts. After you've done this, re-install the counter gears and the counter shafts. The new ball diff is all one piece, so when you've finished, you'll have only three gears.

The diff is fully adjustable, but it comes set fairly tight. I just loosened mine slightly and was very happy with that. To loosen it, hold the gear with one hand and the adjustment nut in the other, and turn the nut counterclockwise. If you loosen the diff too much, excess slippage could cause damage. Be careful that you don't remove the adjuster nut; you could be looking for parts!



Here's a look at the Thorp diff in the gear case. To make adjustments, simply hold the gear with one hand and the adjustment nut in the other, then turn the nut counterclockwise.

Now, reassemble the gear case (notice how much less cluttered it seems!) and attach it to your chassis with the shocks and suspension arms. Put your motor back in, and you're ready to try out your new Thorp ball diff.

Before I tell you how my Clod handled with it, let me tell you why I needed this diff. I do most of my racing on the asphalt parking lot of a mall. It's a great place to race, everyone has fun, and the hobby shop that stages the races does a super job. Our Clod class races on the same track as the 1/12-scale class, and those boys love a tight track—get the idea? You either handle your Clod skillfully or the marshal will handle your Clod for you. It makes for some very interesting driving. My truck has spent more than its share of time upside down, so I was looking for all the help I could get. Low-speed turns cost me races; high-speed turns put me *out* of races. I had done all the suspension tuning I could, and I needed something more. I think I've found it.

PERFORMANCE

With the new diff, my Clod corners better and moves faster. The first time I ran my truck with the diff, I drove it the way I had before—slowing drastically before each turn. With each pass, I went faster, and with each lap, I became more and more impressed with this diff. All monster truckers know the feeling you get when you enter a turn too quickly. Well, this diff will probably make you forget it. With the stock setup, all four tires had the same power going to

(Continued on page 32)

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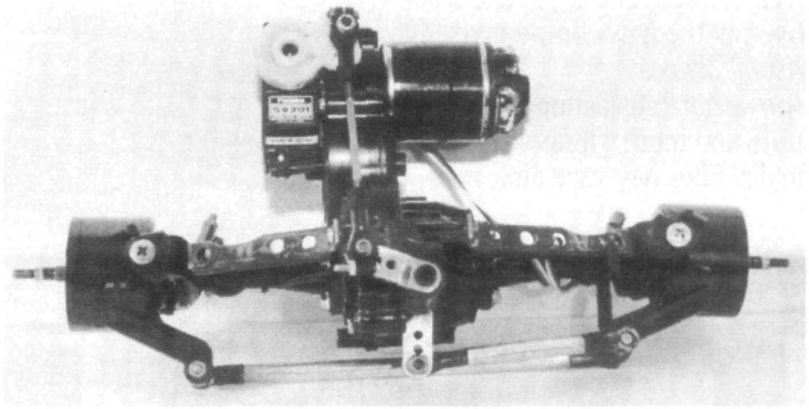


If you mount your steering servo on the front gear case and lock down the rear steering, your Clod will be more stable at higher speeds.

them at all times—even in turns—so the inside wheels pushed as you turned. You either had to make big, wide turns (if you didn't roll first) or slow *way* down to make it. The Thorp diff lets the inside wheels turn a little more slowly; they pull instead of push, so you can make a much tighter turn at higher speeds. It makes it more fun to go crushing.

If you have a modified Clod, you know that if you punch it from a dead stop or out of a turn, it jumps or jerks. That's not good for your gears and, when it happens, your truck is probably a little out of control. This diff gives you the same power, but it's smoother. You're *in* control, you've got it floored, and you're going straight down the track.

If you're into racing your Clod, the Thorp diff will be a very useful addition to your truck. It's just one of many new products available to Clod owners. Monster trucks are a rapidly growing segment of radio control. Keeping up with this sport can be hard, but just keep up with *R/C Car Action,* and we'll keep you up to date.

TECH IDEA OF THE MONTH

At the track where I race, we have our own "King of the Monster Trucks." His name is Terry Plum. He drives a Clod and a race truck and is proficient with both of them. He has had some good ideas, one of which I'll share with you. As many of you who race Clods know, it's hard to keep a 4WS truck under control at high speeds, and a modified truck can go pretty fast. To remedy this problem, it's necessary to eliminate the 4WS feature by locking up the Clod's rear steering mechanism.

To do this, simply tighten the four screws where the rear steering axle pivots (don't overtighten). Also, tighten the screw that goes through the servo-saver spring. A serious hit to the rear wheels might alter your truck's tracking. It shouldn't happen often, but if it does, just grab each wheel and realign them until they're straight.

With this modification, the truck will steer with the front wheels only, and it will be much more stable.

There's at least one problem with this modification, however: you must mount your steering servo on the middle of the truck's chassis, and this means that you must use a very long tie rod; this can cause a great deal of steering slop.

To solve this problem, mount the steering servo on the front gear case. The servo is mounted on the case on the side opposite the motor. Use the same servo-mounting posts. Attach one to the innermost hole on the gear case with a long self-tapping screw. To mount the other servo post, you must open the gear case. With the servo already mounted in the first hole, mark where the second is to go. It will be about ⅛ inch above where the shaft for the small counter gear rests. Drill a hole that's slightly larger than the self-tapping screw you'll use to mount the post. Make a rod about 3¼ inches long, and attach rod ends to each end. This will be your new servo rod. This shorter rod will eliminate virtually all steering play. Be sure to use a servo saver to protect your servo.

If you try this modification, I'm sure you'll be happy with it. It has certainly worked for me! If you have ideas you'd like to share, drop me a line. You just might see your name in *R/C Car Action!*

**Here's the address of the company that's featured in this article:*
***Thorp Mfg.**, 4054 E. Mission Blvd., Pomona, CA 91766.* ■

CAR ACTION TRACK REPORT

WARNING:

This article contains highly concentrated material concerning the most dangerously intense class of R/C off-road racing ever. It should be handled with extreme caution. Prolonged exposure to the contents of this article may cause dizziness and anxiety, followed by a sudden urge to visit the local hobby shop. Store this, and all potentially hazardous R/C Car Action materials, away from small children, bogus copycat rags and boring sideline poseurs. Now that you've been warned, don't blame me if the next few pages change your whole outlook on racing and having fun.

by JEFF BRONSTEIN

Probably the best way to put some kick back into a boring racing schedule is to try something new and different. Every class has its own style, and each can offer a different challenge. Variety is the spice of life; who said that? When I got the chance to test the new Kyosho* Inferno DX, I jumped at it—headfirst.

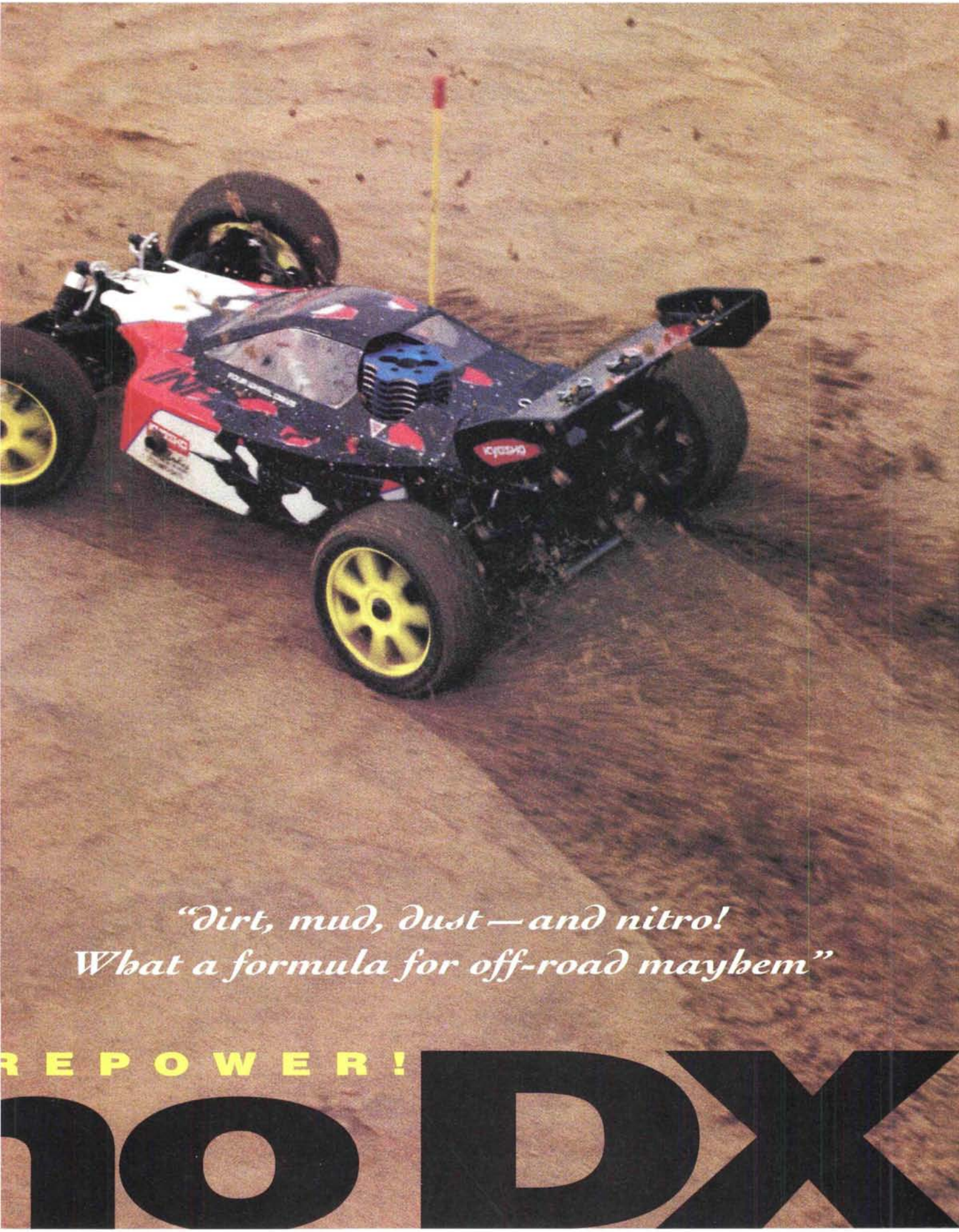
Kyosho's Burns cars were tremendously successful, but the new Inferno DX really turned up the heat. It was designed with gas off-road novices in mind. It combines the pulse-pounding power of a nitro-burning 2-stroke engine with the heavy-duty suspension dynamics of off-road buggies—all at a drastically low price. Because I'm primarily an on-road enthusiast, I guess that made me the perfect patient for an injection of potent off-road antidote.

The Inferno DX is nearly 40 percent cheaper than its full-blown racing cousin, the Inferno, but it still has many of the latest developments in the Inferno line. It includes the same 2.5mm-thick chassis layout and the latest two-piece differential bulkheads. These interlocking bulkheads offer easier access to the front and rear diffs. Twin center-mounted disk brakes feature front/rear adjustable bias for better control and awesome braking. The one-piece aluminum radio tray looks trick and holds all the radio gear for easy installation and trouble-free maintenance. The DX also incorporates the newly redesigned shock towers, lightweight one-piece spoked wheels, BSW-40 racing tires, redesigned front bumper, new Inferno body and the race-proven suspension design of the full Inferno.

KYOSHO

FRUGAL F

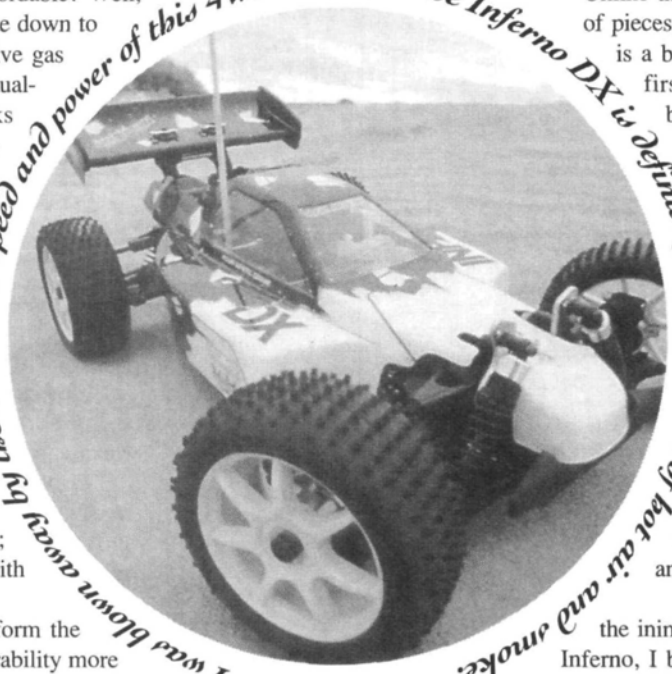
infer


"dirt, mud, dust—and nitro!
What a formula for off-road mayhem"
REPOWER!
DX

How did Kyosho make the DX so affordable? Well, some sacrifices were made to get the price down to where many beginners could afford to give gas off-roading a try. Although the DX is virtually a mirror image of its cousin, it lacks many of the expensive features that give the Inferno its competitive edge. If racing isn't your only reason for buying an off-road gas car, the DX is perfect. Also, the DX is completely "upgradeable"; hop-up components can easily be added as your budget allows. In place of the large-volume hard-anodized aluminum shocks, the DX has a perfectly good set of nylon-body shocks. Instead of the relatively over-designed hardened-steel bevel gears, the DX has cast-aluminum gears. The center diff is perfect for tearing up the terrain; when it's time to race, just upgrade it with the steel center gear and limited slip unit.

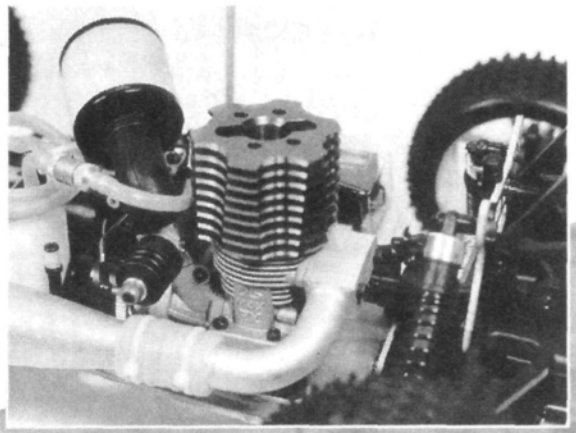
Many of the upgrade parts that transform the DX into an Inferno enhance the DX's durability more than they enhance its performance. (Check out "Troubleshooting," February '93). Personally, I'm not sure which is more brutal on a car: championship racing, or burning up a vacant lot. Although it isn't included, Kyosho's bearing kit for the Inferno (KYOC4251) will vastly improve the performance and durability of the DX and its engine. I highly recommend that you use the bearings from the start. Also, for a few extra dollars, you can replace the nylon disk brakes with Kyosho's fiber brakes (KYOC2591). They're much stronger and more reliable than the stock units.

"I was blown away by the incredible speed and power of this 4WD buggy... the Inferno DX is definitely not just a lot of hot air and smoke."

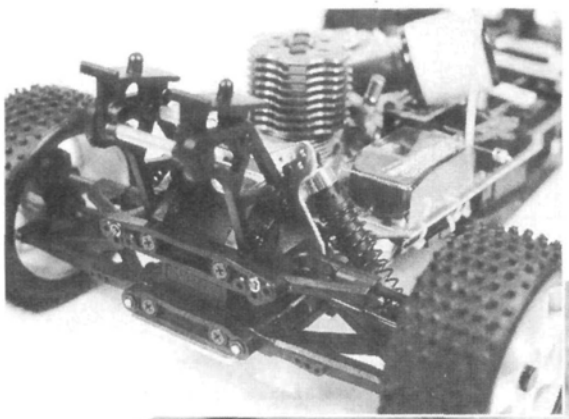


Unlike the Inferno, which arrives in hundreds of pieces, the DX is partially assembled. This is a big plus, especially if the DX is your first off-road kit. All three diffs have been assembled and installed in their bulkheads. Brakes, drive shafts and shock towers are mounted on the chassis and ready for the remainder of the car's suspension to be completed. The rest of the kit is divided into sequentially numbered plastic bags, making assembly a cinch. I hope I don't need to remind you that reading the instructions carefully before you begin is a must. The manual includes plenty of detailed diagrams; it would be better if it included additional details on set-up and maintenance.

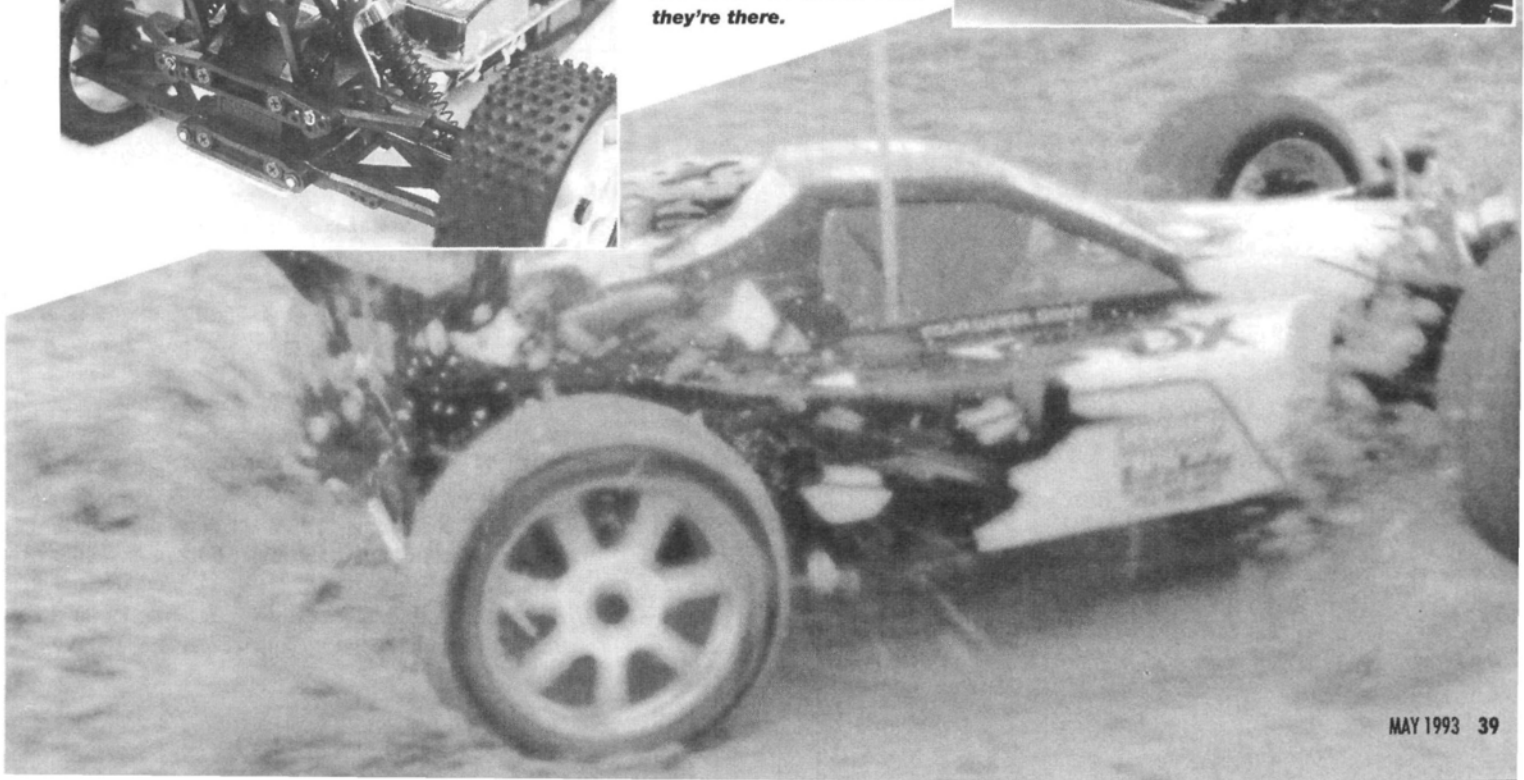
Following the recommendation of the inimitable Mr. Pond in his review of the Inferno, I built the front and rear shocks using Associated silicone oil—40WT in the front and 30WT in the rear. The nylon shocks are smaller then the large-volume shocks, but they feel very smooth and depend-

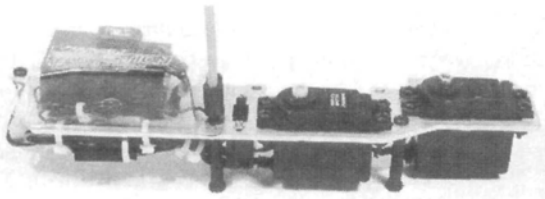


Right: most high-performance engines are too expensive for DX owners, but the O.S. RX-B is reasonably priced, very reliable and a perfect fit for the Inferno DX.

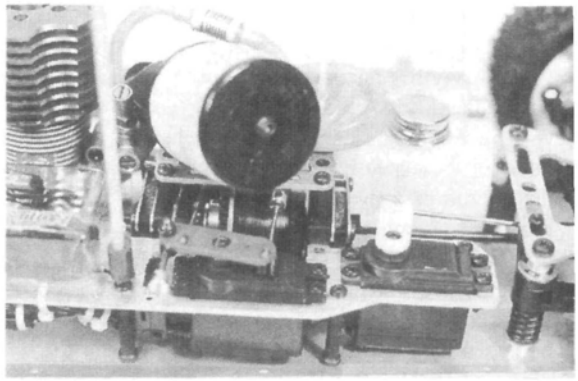


Left: the sophisticated four-wheel suspension has several mounting positions. Although beginners may not appreciate them, it's nice to know that they're there.





Left: just unscrew six setscrews to remove the one-piece radio tray from the rest of the chassis for easy maintenance and cleaning.



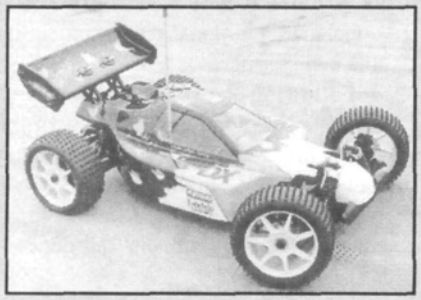
Right: at least one high-torque servo is necessary for the steering, but the latest high-tech radio equipment is optional.

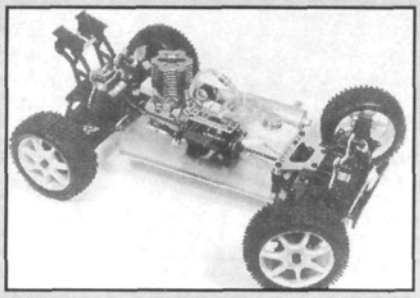
able. Before installing the A-arms, I carefully polished the pivot pins and removed the flashing from the molded parts. This makes all the difference on a race car that depends, above all, on traction. The uprights and drive shafts slide into place easily. I particularly like the many options for suspension adjustment. There are several mounting holes for the upper and lower suspension arm pivot pins (roll center adjustment), and even more for the shock pivots. All these adjustments may not be necessary for beginners, but it's nice to know that they're there. For now, I mounted the suspension arms and shocks using the factory-recommended positions.

Deciding which engine to use in the DX can be particularly complex for a novice. The stock O.S.* RX-B proves to be an excellent choice for easy installation, rugged durability and nearly unsurpassed power. Its extra-large, blue heat-sink head is designed specifically for off-road applications, and it helps dissipate more heat from the engine than regular cylinder heads. Engine mounts and throttle linkage fit the O.S. like a glove. Not only is the RX-B particularly suitable for the Inferno, but it's also one of the top picks of many Inferno racers. In any case, I would spend *my* money on a few more of the chassis upgrade parts before I invested in a faster motor.

Neither does it make much sense to save money on the car and spend pocketfuls on fancy radio gear, but if you're planning a future in R/C racing, you won't want to limit yourself to the most basic system. The DX does require a heavy duty steering servo and I suggest a 600 to 1000mAh receiver battery pack, but the transmitter and receiver need not be the latest technological wonders. 'Nuff said! I chose Airtronics* sealed 94738 servos for both steering and throttle. They're not as quick as the Pro Series 94151s or as brawny as the 94152s, but they cost much less and they're more than enough to do the job. Radio of choice: at any price, the Airtronics CS-2P and receiver are my favorite, but just about any mid-priced package will do.

While I finished the chassis and radio installation, I sent the new Inferno body to paint charmer Scot Bich of





KYOSHO INFERNO DX

Scale 1/8
Price $429.95
Type .....4WD gas off-road

DIMENSIONS:
Overall length .....17.8 inches
Width .....12 inches
Wheelbase .....12.9 inches
Track (f/r) .....10 inches

WEIGHT:
Gross (with fuel) .....7 pounds, 6 ounces

BODY:
Type .....Single-seat buggy
Material .....Polycarbonate

CHASSIS:
Type ....Plate chassis w/upper radio tray
Material .....Aluminum alloy

DRIVE TRAIN:
Primary .....Pinion/spur/clutch
Transmission .....Center bevel diff
Differentials .....Bevel gear
Bearings/Bushings .....Bushings (95%)

SUSPENSION:
Front:Type .....Lower A-arm/upper adjustable link
Damping .....Oil-filled, coil-over shocks

WHEELS:
Front/Rear .....One-piece plastic
Dimensions (DxW) (f/r) .....3.15x1.75 inches

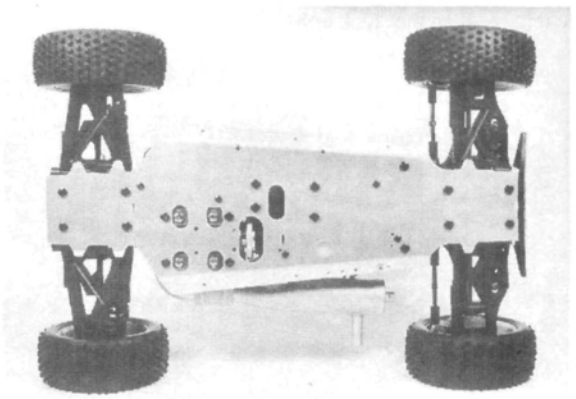
TIRES:
Front/Rear .....Kyosho BSW40 mini-pin spike

POWERPLANT:
Engine/Carb .....Paris Mod. O.S. RX-B 3.5cc
Pipe .....DuraTrax

OPTIONS TESTED:
O.S. RX-B .21 engine; Kyosho Inferno ball-bearing set and fiber disk brakes; Airtronics CS-2P, receiver and 94738 servos; Sanyo* 5-cell 600mAh receiver pack; Blue Thunder* fuel; McCoy* fuel filter; Bich 'n Bodies painting and detailing.

HITS:
- Low price
- World-class chassis
- Upgradable
- Extensive factory support
- Partially pre-assembled
- Speed, speed, speed!

MISSES:
- Needs bearings
- Some replacement parts very expensive (body)
- Limited upgrade directions
- Limited chassis or engine set-up tips
- No maintenance tips



The sturdy aluminum chassis is very rigid and light. The oval hole reveals the flywheel.

Bich 'n Bodies* for some of his gleaming special effects. I've seen many of Scot's masterpieces, but this, in my opinion, is his "pièce de résistance." I maintain the opinion, however, that the color pink is aerodynamically less efficient than any other color. I think it has something to do with molecular structure or puffy little furry things (just a joke, kids).

With fuel, starter and DX in hand, it was off to the desert for the first test run. Some friends joined me with their trucks to check out the action. After breaking-in the engine using a few carefully monitored tanks of fuel, I dialed the carb mixture down for some flat-out fun.

The DX carved up the steep sand slopes like an electric knife on a Thanksgiving turkey. Electric trucks were no match for the DX. From a dead stop halfway up the dune (where the other trucks were buried), the DX sent rooster-tails of sand into the air as it scampered up the hill.

I was blown away by the incredible speed and power of this buggy. Although it has a low price tag, the DX is definitely not just a lot of hot air and smoke. Tight turns and large bumps are no problem for the heavy-duty suspension. The car reacted like a sure-footed cat chasing its prey. Above all, there's nothing like the sound or the smell of a 2-stroke engine. It's no wonder that Kyosho is trying to make it available to more potential racers.

It all started to come back to me: dirt, mud, dust—and *nitro!* What a formula for off-road mayhem. No regular electric buggy or truck can hope to catch the Inferno DX. This kind of racing could really set the off-road racing world on its ear.

There's no question that the DX was born with world-champion blood, and it's a bargain. But before you go out and buy it, here's a brief word of caution: this is a sophisticated, high-performance piece of machinery not meant for those with weak hearts or short tempers. Gas cars in general require more set-up, more maintenance and, above all, more patience.

Let's be honest: if you want a car that hops out of the box and is ready to race, you've read too much of this article already. But if you're ready for the biggest thrill ever to hit a dirt track, and you don't mind putting some effort into understanding how your car works, go get the Inferno DX...*now!*

**Here are the addresses of the companies mentioned in this article:*
***Kyosho**; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61824.*
***O.S.**; distributed by Great Planes Model Distributors.*
***Airtronics Inc.**, 11 Autry, Irvine, CA 92718.*
***Bich'n Bodies**, 4903 Cloverfield Rd., Pearland, TX 77584.*
***Sanyo Electric**, Battery Division, 200 Riser Rd., Little Ferry, NJ 06743.*
***Blue Thunder**; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821.*
***McCoy Racing**, 1778 Albright Ave., Upland, CA 91786.* ■

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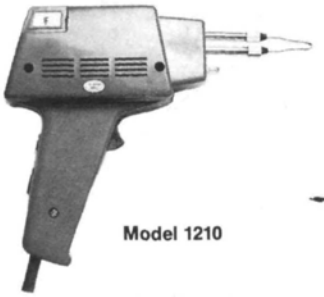
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Model 910

Model 300

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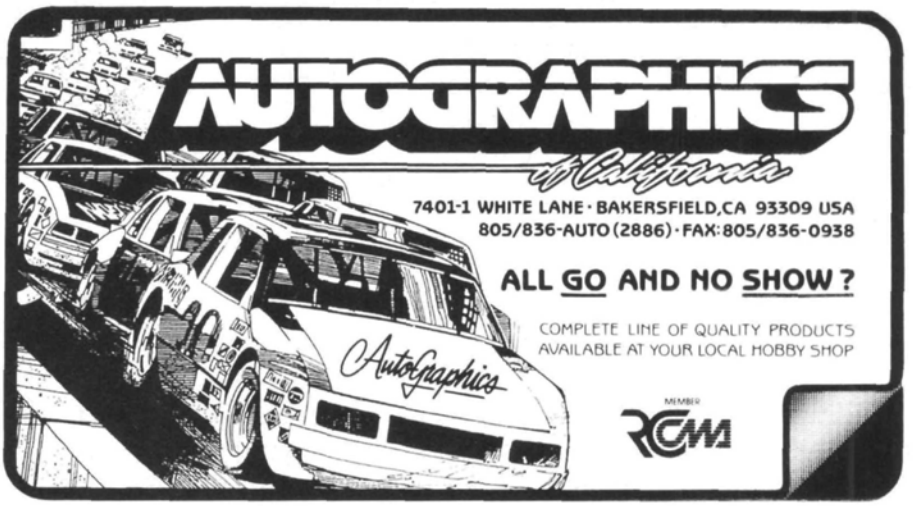


NITRO NEWS

TWENTY MORE QUESTIONS, NITRO STYLE

by JEFF BRONSTEIN

KEEPING UP with all the new developments in gas racing could be a full-time job. In fact, it's mine. I'm constantly contacting manufacturers for the latest information on new products. In addition, every month I receive countless calls and letters from readers who have specific questions about minor problems, product reviews, personalities, set-up tips and all around hot news. As a part of this column, I occasionally answer several of the most common questions. On the rare occasion that I don't know the answer—seems almost impossible, doesn't it?—I rely on the most noted gas-racing authorities to find the solution. It's my life to make sure that gas racing doesn't pass you by. OK, time to get busy!

Q In the 1/10-scale scene, gas is really catching on. Where are the rules?

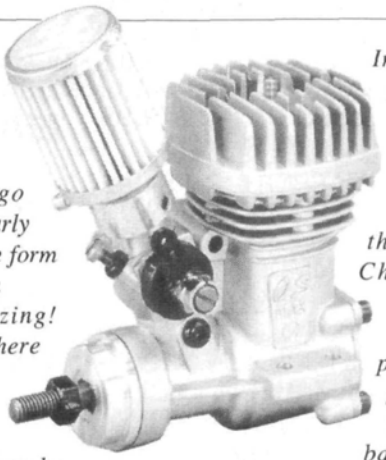
A *Chicago was the meeting place for all but one of the ROAR 1/10-scale gas rules committee members. Behind closed doors, the committee pounded out a very comprehensive set of rules for next season. Along with several noted gas experts, nearly every major manufacturer was represented. It seems that ROAR is on the verge of a major breakthrough in R/C racing.*

Q I've heard something about a "claiming rule" in the new gas rules. What is this rule about, and how does it work?

A *A claiming rule is basically used to keep everybody honest. In electric racing, stock motors are supposed to be equal. Well, the stock equation works well in theory, but not so well in practice. There are still some people, albeit few, who will go to any length to ensure that their "stock" motor is better than anyone else's. The claiming rule would allow drivers in a main event to "seize" the winning engine after the race. In other words, racers might spend less time and money modifying their engines if they risk the very real possibility of having to give it—and all their speed secrets—away. Sure, it isn't perfect, but its closer.*

Q Gas racing seems like a lot of fun. Will it ever be as popular as electric?

A *At the Chicago RCHTA show, nearly every exhibitor had some form of gas-related product on display. It was amazing! Everywhere I looked, there were cars and trucks sporting hot 2-stroke engines. If the show was any indication, it may be time to stock up on fuel.*



Q The Associated/Paris/Picco team dominated the ROAR 1/8-Scale Nationals in Albuquerque, NM, but I haven't seen a review of the Picco Genesis. Will *Car Action* review it soon?

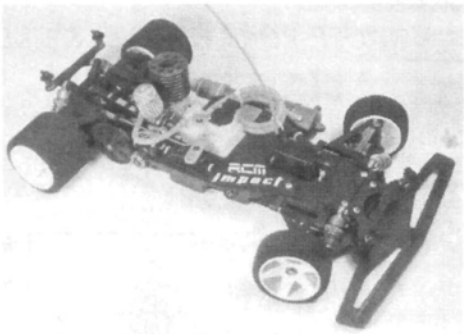
A *¡Sí, amigo! Watch for a feature about Mike Swauger and his winning car soon, as well as a complete review of the Picco Genesis with helpful hints from the Paris man himself, Ron Paris.*

Q The Serpent Impact looks like a great 1/10-scale gas car. Are there any *new* 1/10-scale on-road gas cars to consider?

A *R/C Motorsports of Miami has done a great job refining the Impact to the competitive version it now distributes. But some new contenders are making their way into the scene. Racer's Choice will soon introduce the BMT's full-suspension 1/10-scale gas car, and like the Im-pact, it's basically a smaller version of its World Champion 1/8-scale brother. Schu-macher's new Daytona is also very fast, using a combination of full rear suspension and 10L-type front suspension. For pan-type chassis, the DuraTrax GT-10 and the Composite Craft Python both have chassis that are very similar to those of electric on-road cars—fast, exciting and simple.*

Q What's the news on gas-powered stadium trucks and Associated's new nitro-powered RC10T?

A *Gas-powered off-road trucks are big! Really big! The new Traxxas Nitro Hawk looks like a real dynamo. Kyosho's Outlaw Rampage is still making news, and the new DuraTrax gas-truck conversion kits for the RC10T and LX-T are blowing the doors off their battery-powered buddies. But the real*

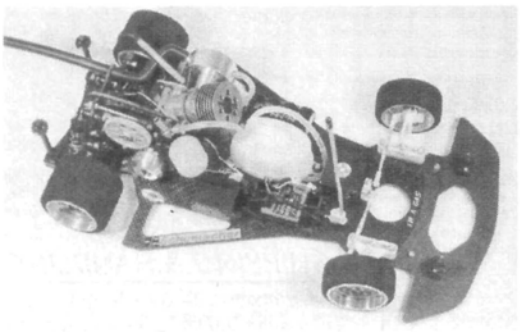


Serpent's 1/10 scale Impact

news looms on the horizon. Associated has leaked word about the existence of several prototype gas-powered racing trucks. The unnamed nitro-powered truck could debut as early as the Kyosho/Car Action West Coast Gas Off-Road Championship at the end of January, but don't hold your breath.

Q It seems that most 1/8-scale gas kits are manufactured abroad. Are any U.S. manufacturers making competitive 1/8-scale racing cars?

A *Though many of the top cars are made in Europe, one very popular 2WD on-road kit is made in the USA. Delta Mfg. has been making on-road 1/8-scale gas racers since before many of today's racing legends were born. Along with the popular 1/10-scale Villain, Delta also manufactures the P-2 1/8-scale gas racer. Rumors that the P-2 would receive a major overhaul sparked interest in many racers, old and young. A new spring-loaded clutch and an improved suspension may be signs of more American ingenuity to come.*



Schumacher Nitro 10 Daytona

Q *Car Action* is always the magazine with the most information about everything going on in R/C racing, aren't you? Are you guys always the first to hear about something new? Does somebody call you when they introduce a new car? Can I always get the best race coverage from you? Is gas racing a lot of fun? Is "Nitro News" the best source of gas news? Do I ask too many questions? Wouldn't you just like to kill me?

A *Why...yes.*

Q What's the difference between a "bevel" differential and a "planetary" differential?

A *Both bevel- and planetary-type diffs are gear diffs (as opposed to ball diffs). A bevel-gear diff has two large cone-shaped gears on the drive-axle shafts with several smaller cone-shaped gears coupled between them. A planetary-type diff has two sprocket-type gears called "sun" gears on the axle shafts, and they're coupled to several barrel-shaped "planetary" gears. Although generally not adjustable, both types of gear diffs eliminate the chance of slipping that's associated with ball diffs.*

Q I'm looking for after-market parts for my gas-powered cars. Can you point me in the right direction?

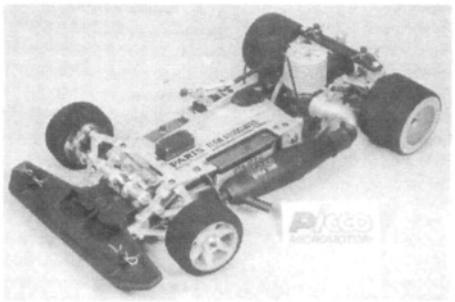
A *Two excellent sources of specialty on- and off-road racing parts are Alpine Motorsports and Ace Hardware Hobbies. They carry a wide variety of kits, engines and parts for 1/8- and 1/10-scale gas cars and trucks. Check out some of their tough alloyed parts for Mugen, Kyosho, BMT and Serpent cars.*

Q It seems so easy to pick out an electric motor; how can I decide which engine to buy?

A *You'll develop likes and dislikes about different engines, the way you have about motors. One way to choose is to see what the fast guys at the track are using. In 1/8-scale racing, there are O.S. engines, the Leo engines, the new Serpent Mega engines and several others in development. Even legendary engine and fuel guru Steve O'Donnell is reportedly developing a new high-output 1/10-scale powerplant.*

Q Is a "fuel gun" something I use to kill my competition? Do I need one? What is it and how does it work?

A *Although a fuel gun, with its long barrel and trigger valve, does look something like a real gun, it can't eliminate your competitors. It can, however, make pit stops much quicker. The gun holds fuel in a cylindrical chamber that fits easily into the throat of the fuel cell. When the trigger is pulled, two valves open and allow the liquid to rush into the tank. When the tank is full, the gun automatically shuts off. Whether or not you need one depends on how fast your pit crew is now.*



Picco Genesis 1/8 scale racer

Q It seems that 1/8-scale racing is still much more popular in Europe. Which are the most popular cars over there? Which are winning races?

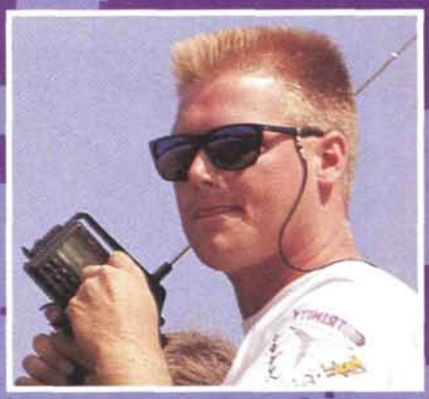
A *Although European racing is divided into very different classes, the most recent 1/8-Scale On-Road Eurochamps were dominated by the PB Diamond, driven by Gary Culver. The Diamond is a fairly new car and it has a similar layout to the BMT and Picco cars. In off-road racing, the Kyosho Inferno burned up the competition at the World Championships. Others to watch for are the new Pirate M3, the Probe, the Mugen SS '93, the BMT 911 and an interesting French car with which Ron Paris is reported to be experimenting here in the U.S.*

If you have a question or a comment concerning gas cars or trucks, or if you'd like to see a subject addressed in this column, send a letter to "Nitro News," R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If your crayon scribble/chicken-scratch handwriting is legible, we'll get on it. ■

Top 10

• CARS • TRACKS • DRIVERS

• GIZMOS • BOLT-ONS •



• GIZMOS • BOLT-ONS •

• CARS • TRACKS • DRIVERS

WE KNEW it was coming. We couldn't avoid it. We scurried through the hallways, keeping close to the walls and staying away from brightly lit areas. We hid under our desks. It was a vain attempt to avoid the inevitable.

Then it came: the summons. "The Ayatollah of Radio Controlla requests the pleasure of your company. Conference room. Now." Some request. It should have read, "If you don't show, the Ayatollah will rip your head off and make you carry it around in bag." So we shuffled in, dreading the ordeal that lay before us. A few days later, we emerged—amped out on a diet of caffeine and doughnuts, bleary-eyed and a little worse for wear—but with mission accomplished.

And what was the mission?—the annual Top 10 meeting, of course. After gruelling debates, we chose the Top 10 cars, drivers, tracks, bolt-ons and gizmos in the R/C car industry. And before you start writing letters to tell us that there are *12* Top 10 cars, put down your crayons and listen up: we know you know how to count, but with the onslaught of nitro fever, we had to add more categories. Had we known a few years ago, we would have named this annual treasure *Car Action's* Top 12. But we didn't, so shut up. Jeeez. We do and do and do for you kids, and *this* is the thanks we get.

Top 10 CARS

IF OUR ANNUAL Top 10 issue were an awards show, then this category would be the one they'd save for the end. Well, we're giving it to you up front, in living color. So, who are your friends? The *Car Action* crew. We could have been like an awards show. We could have made you watch some has-beens trade inane quips. We *could* have made you watch Rob Lowe sing and dance, if we wanted to be *really* cruel—but we didn't. We like you. So for you, our very best friends, here are our Top 10 cars (and trucks) for '93.

1/12-SCALE ON-ROAD

ASSOCIATED RC12LW

The 12LW's track record is more than sufficient to justify its standing among the Top 10. Since its release, the 12LW has won two IFMAR World Championships (in '90, driven by Chris Doseck, and in '92, by Tony Neisinger) and has dominated the ROAR Nationals, the Sanyo Triple Crown series and the Cleveland Indoor Champs. Based on the Associated 12L, the 12LW gives you a choice of chassis (graphite or fiberglass plate); it also has a dual ball-pivot rear T-plate suspension with a friction-damping upper pod plate. What separates the 12LW from the 12L is its chassis plate's revised battery-mounting position, its damper tube brace and its rear suspension's oil-filled, coil-over shock. The 12LW is *the* car to beat in 1/12 scale. At tracks across the country, you'll see more 12LWs than any other brand entered in competition. Apparently, you already knew which car was tops!

1/8-SCALE GAS ON-ROAD

PICCO GENESIS

This Italian 4WD car, imported by Associated and Paris Racing, enters the Top 10 with a bang—it's the '92 ROAR National Champion. Design-wise, the Genesis is similar to the world champion BMT 891, but many of its suspension components are made of cast-aluminum instead of the BMT's molded nylon. Heat and stress tend to distort plastic parts, but the Picco's metal parts remain constant regardless of temperature.

The Genesis' front suspension has upper arms that are canted forward (to alter caster as the suspension compresses and aid in low-speed steering). Its rear suspension is fully independent for superb road-holding.

Team Associated—including top drivers Mike Swauger and Ralph Burch Jr.—now races the Genesis instead of its RC500 car. This was a prudent decision; Swauger and Burch were the fastest at the Nats (Swauger won).

1/8-SCALE GAS OFF-ROAD

KYOSHO INFERNO

Introduced in '91, Kyosho's 4WD dirt-burner quickly established itself as the king of gas off-road with victories at the '92 Southeast Gas Challenge and the '92 Kyosho World Off-Road Challenge. As if this weren't enough, the Inferno is the new IFMAR World Champion. Everything you need to win comes in the Inferno's box: a tough aluminum chassis plate that also dissipates engine heat; front and rear gear diffs; an adjustable center diff that splits the front/rear drive ratio properly; and high-quality, oil-filled coil-over shocks at all four corners. Stopping power is provided by an excellent dual-disk-brake system that allows you to set front and rear braking action precisely. All these features, plus extensive factory support and parts availability from Team Kyosho USA, make the Inferno one of the best buys in the gas market.

1/10-SCALE GAS OFF-ROAD

TRAXXAS NITRO HAWK

The Nitro Hawk really brings the fun and excitement of gas off-road within everyone's reach. The truck comes assembled, and the engine is included. The only choice you have to make is whether you wish to install your own radio gear or opt for the model with Traxxas radio gear installed. A heat-dissipating aluminum tub chassis is standard on the Nitro Hawk, as is the race-winning suspension from the popular Blue Eagle LS truck. All that's required to run the Nitro Hawk is fuel and a glow igniter. A handy pull-start mechanism comes attached to the Image .12 engine.

Best deals on wheels!

1/10-SCALE GAS ON-ROAD

SCHUMACHER NITRO 10 DAYTONA

This potent, full-suspension road car from Schumacher is an interesting blend of off-road-type rear suspension and pan-car front suspension.

Everything you need to hit the track (except fuel) comes with the Daytona, including a powerful Irvine .15 engine with a pull-starter and a handy onboard glow ignitor system.

The first-ever Car Action 1/10-Scale Gas Shootout was an exhibition event at the '92 ROAR 1/8-Scale Nats, and Daytonas dominated. (Mike Swauger took the win.)

The Daytona comes with all the necessary bits and pieces, so it has appeal as an entry-level car, but it's also one of the most capable on the track, so serious racers will find it interesting as well.

ON-ROAD RACER

TRINITY EVOLUTION 10

This new roadcourse ravager has created quite a stir in the R/C racing community.The prototype of the Evolution 10 hit the track at the inaugural IFMAR 1/10-Scale On-Road World Championships, and it made quite an impression. From his second-place starting position, driver Joel Johnson managed to jump the entire field and he never looked back—in all three A-Mains! No other car or driver has ever dominated an IFMAR event as Joel and his Evolution 10 did. A rigid graphite chassis, Reactive Caster front suspension, and Triad triple-shock rear suspension ensure that the Evolution 10 will handle precisely and consistently on both paved and carpeted roadcourses. The car's unique battery placement (all six cells mounted at the car's center) lets it change directions with cat-like dexterity and eliminates cumbersome saddle packs that must be taped into place. All in all, the new Evolution 10 has one of the most versatile chassis available. Its high-quality parts and finish, in addition to its already-legendary track record, have secured it a place in our Top 10.

Top 10 CARS

MONSTER TRUCK

MRC THUNDER KING

"Wait a minute," you say. "Monster trucks have to be 1/10 scale and 4WD." I don't *think* so. Big and tough. That's what defines a monster truck, and the MRC Thunder King has these characteristics—in spades. The Thunder King is the biggest electric truck, there's no argument about that. But is it tough? You bet. Beefy suspension arms and a super-rigid alloy chassis can take the punishment of backyard bashing and track torture. MRC's Power Command transmission, with its racing-type ball diff and slipper clutch, ensure that all the power from the Thunder King's two 540 motors reach the ground efficiently. The King has been designed from the ground up to be one of the most durable and enjoyable R/C vehicles ever to chase a cat, tip over a barbecue, or tear up a track. Fun, fun, fun.

2WD OFF-ROAD

ASSOCIATED TEAM CAR

Last year's best is this year's best. The Team Car enters the '93 racing season virtually unchanged—but then again, why tamper with perfection? For '93, the Team Car comes with 30-degree (instead of the old 15-degree) caster blocks that give it better steering and more stability on the straights. Also, look for new shock pistons for Associated's hard-anodized Team shocks.

The Team Car's list of major wins could fill an entire book, but its most recent include the '92 ROAR and NORRCA 2WD Modified Nats (both at the hands of team driver Brian Kinwald).

Associated's much-anticipated Stealth car is still a long way off, but for now, racing enthusiasts are more than happy. The Team Car will be a tough act to follow.

1/10-SCALE SUPERSPEEDWAY

ASSOCIATED RC10LSS

What's that saying? "Often copied, never duplicated"? The 10LSS brought the excitement of superspeedway racing to the masses.

Its tried-and-true front suspension and rear T-plate suspension make the SS version of the popular 10L the most-wanted ride at banked-oval tracks across the country. It wasn't the first car that was designed to hold batteries on the left side of the chassis, but it has certainly become the most popular.

The most recent victory on the 10LSS' extensive list is Cliff Lett's at the '92 Thunderdrome's hotly contested and exhausting 150 Pro Super Speedway A-Main.

ENTRY LEVEL

TAMIYA SUPER BLACKFOOT

The truck that started the entire monster/racing craze is back with a vengeance!

The new Super Blackfoot carries on the tradition of the original 'Foot, but many parts have been updated. A revised front suspension with longer "I" arms help it to corner more sharply and resist roll-over. By far the biggest improvements were made to the rear of the truck. Gone are the flexing plastic trailing arms and "laid-down" shocks. Independent A-arms are fitted to its updated tranny, and new shocks are attached to towers that have improved geometry. Dogbone-type driveshafts replace the old Blackfoot's hex-shafts, which were prone to becoming stripped.

RACING TRUCK

TEAM LOSI LX-T

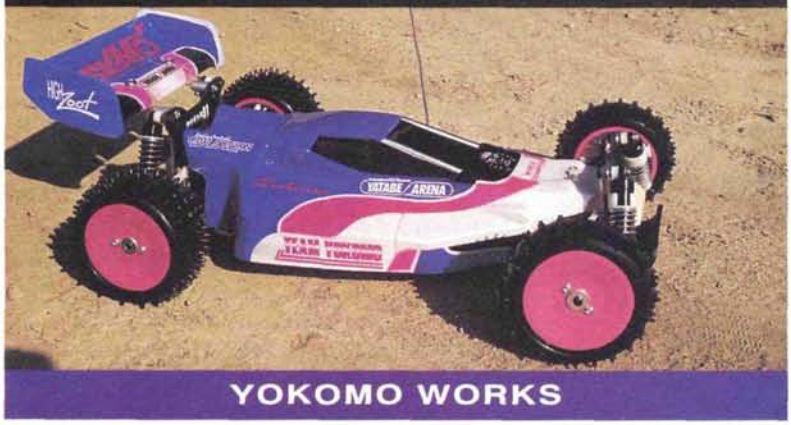
Because it was the first design to take advantage of the newest, hottest tires, the LX-T raised the level of competition in the very popular truck class.

Equipped with Team Losi's latest goodies, e.g., a light, rigid molded fiber-matrix/resin chassis and suspension arms molded of Losi's "Stiffezell," the LX-T (in the talented hands of team driver Kyle Reed) emerged victorious in the Stock class at the '92 ROAR Truck Nats.

Losi's Hard Body shocks and new color-coded springs help the LX-T to maintain ground contact over the harshest terrain, and, as with all Losi cars and trucks, the LX-T will accept the Hydra Drive unit. The LX-T's unique, one-piece wheels have outer shields that prevent dirt from clogging the wheels.

Race-proven features and extensive support from Team Losi make the LX-T a very hot deal in racing trucks. Check one out.

4WD OFF-ROAD



YOKOMO WORKS

Though it isn't really available in the United States, the Yokomo Works has made quite a name for itself in the racing community.

At the '92 ROAR Off-Road Nats, Team Associated drivers J.D. Beckwith and Mark Pavidis (both driving Yokomos) duked it out in the 4WD class (Beckwith took the win; Pavidis was a close second.)

The current version of the Yokomo is called the Works '93, and it's based on the car that Cliff Lett drove to capture the '91 IFMAR World Championship.

The '93 has longer front and rear suspension arms and special steering hub-carrier braces that prevent unwanted caster change during acceleration and braking. It also has a friction-type slipper clutch that's similar to the one used on the Associated Stealth transmission.

As of this writing, several major U.S. companies are closely scrutinizing Yokomo's line of cars and accessories; do we have a potential importer in the bunch? As usual, we'll keep you informed of any developments.

Top 10 TRACKS

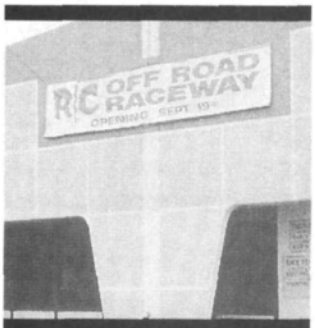
This is it gang—the best of the best—*Car Action's* Top 10 tracks on the planet! They range from massive concrete tri-ovals and hellacious high-banked superspeedway courses to the ultra-elite off-road tracks. If you have the chance, we hope that you'll stop by a few of these tracks to see first-hand why they're gracing these pages.

YATABE ARENA, TSUKUBA CITY, JAPAN

Completed in 1989, the Yatabe Arena is located about 31 miles from Tokyo, and 75 minutes from the Tokyo International Airport.

Owned by Yokomo, the track doubles as their test track. It has a retractable roof, plenty of electrical outlets and pit tables for 150 drivers. There's a huge drivers' stand and an air-conditioned control tower that has a clear view of the entire track. The track has the latest computer AMB lap-counting system, and an air-conditioned parts shop next door that also offers a good view of the races.

The Yatabe arena has held such notable races as the first two Reedy Races and the first Champion of Champions ('90).



R/C OFF-ROAD RACEWAY, FOUNTAIN VALLEY, CA

The R/C Off-Road Raceway—a brand-new track in a 12,000-square-foot building—is 50 feet wide by 105 feet long, and it has 9-foot-wide lanes. Construction on the facility began on August 1, 1992, and it was completed four weeks later. B&B software keeps track of the races.

A fully stocked hobby shop on the premises has all the latest off-road cars, trucks and accessories. There's even a full-service repair shop, and a snack shop is on the way.

The Reedy/Novak Truck Challenge will be held here in late March; it will also host the Monster Mash truck race and the Western Off-Road Championships.

LAKE WHIPPOORWILL, ORLANDO, FL

Built in 1985, Lake Whippoorwill is the track that started the superspeedway racing boom. Nicknamed "the Whip", it was the first track ever to hold a national oval race, and it can also be credited with starting the "parade of cars" (in which every car at the event is lined up on the track). In 1987 the first-ever enduro race was held there and more than 40 major national events have been held at the 400-foot track (the latest was the Trinity Speedworks Race, and every April 1, the Whip hosts the Masters Race.) A new concrete roadcourse track in the center field has received favorable reviews from many racers.

Deemed "the Daytona of R/C racing," the Whip draws at least 25 tourists a day from all over the world. (It helps that the track is conveniently located near Disney World.) It's also a popular testing ground for any on-road product that must withstand the "ultimate" torture testing.

LAKE MAYER SCORE, SAVANNAH, GA

The SCORE track in Savannah, GA, was built in April, 1986, and the facility, which combines a clay oval and an off-road section, is run by Phil "The Colonel" Hurd. The track takes up an area that's 80 feet wide and 120 feet long. The off-road track itself is roughly 580 feet long, with 8- to 12-foot-wide lanes. A covered 32-foot drivers' stand is accessible by wheelchair, and it has an 8-foot addition that can accommodate two wheelchairs. Pit space is plentiful—there's room for 75 people—and it has electricity. The track is equipped with a complete auto-scoring setup with B&B System 20 software and a BoLink AMB lap-counting system. The Lake Mayer facility, which is lighted for night racing too, is set in a county park, and it's conveniently close to hotels and many restaurants. SCORE has hosted such major races as the '91 ROAR Off-Road Nats, '92 ROAR Truck Nats, the '89 and '90 Region 2 Championships and the 4th Annual State Champs.

AMERI-TRAC, MATTOON, IL

Established in 1990, the Ameri-Trac tri-oval features a 400-foot center line with 16-foot-wide lanes and 12-, 10-, and 8-degree banked turns. The main straight is more than 120 feet long.

A 40-foot-long drivers' stand covers roughly a third of the length of the front straight, and it's wheelchair accessible. A Bolink AMB lap-counting system is housed in the scoring building that's adjacent to the track.

A huge pit area (it has electricity, of course) covers almost 5 acres and holds 300 racers, and Country Corners Hobbies next door has any last-minute items a racer might need. If you get bored, there's a off-road track nearby as well!

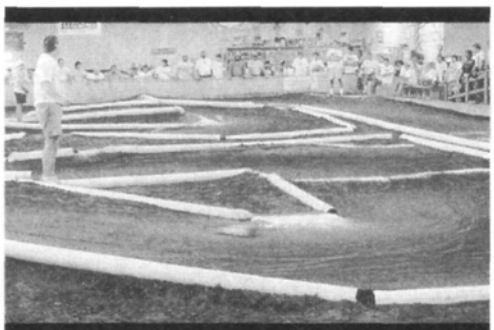
DOMINGUEZ HILLS VELODROME, CARSON CITY, CA

The Dominguez Hills Velodrome in Carson City, CA, hosted '92's biggest on-road car race—the Thunderdrome. Organized by Dan Moynihan and Gary McAllister, the Thunderdrome is an extravaganza that shouldn't be missed.

Built to host the '84 Olympic bicycle competition, the track is 1092.24 feet long ('91's Thunderdrome track in Encino was only 820 feet). Bicycle racers and R/C racers agree that the Velodrome is an excellent facility. The fastest R/C car was piloted on this track

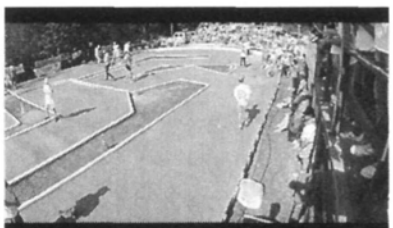
All I wanna do is zooma zoom zoom

In 1987, Tommy Welding Jr. opened the Hobby Haven Raceway—an indoor facility that covers a total of 19,000 square feet. The facility can hold up to 300 drivers, and it's equipped with benches and electricity for each racer. The racing history of the Hobby Haven Raceway includes such big events as the Twister Off-Road Championships, the '90 Team Losi Summer Challenge and the annual Reedy Top-Gun Race. Future events include the '93 Reedy Race of Champions.The Livermore area has five hotels, 20 motels and dining that ranges from fast food to gourmet meals.



HOBBY HAVEN RACEWAY, LIVERMORE, CA

The West Coast R/C Club track, home of the popular Florida Winter-champs race, will host its 7th Winter-champs race in as many years of operation. Racers from many countries, including Japan, England, Germany, Canada, the Virgin Islands and Norway will come to Tampa to compete. The track, which is located in Lake Park, takes up an area 135 feet long and 54 feet wide. The running length of the track is roughly 476 feet, and it varies in width from 8 to 11 feet. There's a 30-foot-long covered drivers' stand that's elevated 7 feet. The fully powered pit area can handle up to 500 racers and a concession stand is nearby. An AMB system with new-style transponders keeps the score, and the track is open any time the park is open.



WEST COAST R/C CLUB, TAMPA, FL

SEMROCC, STERLING HEIGHTS, MI

The SEMROCC track in Freedom Hill Park hosted the Kyosho/Trinity '91 IFMAR Worlds. This track also has held the largest single R/C event ever—the '89 Off-Road Nats, in which 650 entrants participated.

The track is 170 feet long and 70 feet wide, and it's surrounded by grass. The width varies from 8 to 14 feet, and it includes sharp turns and a 100-foot-long back straightaway. Water and electricity are available at the track.

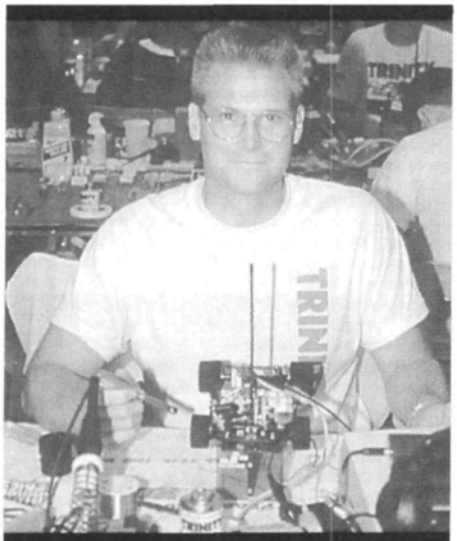
The track also features a 32-foot drivers' stand and a scorers' booth with the latest AMB counting system. The track is large enough to hold an ⅛-scale gas race; the Kyosho Gas Challenge was held there last summer.

Host of the '92 IFMAR On-Road Worlds, the Ranch Pit Shop Raceway has been holding races for 12 years. Run by Jim Halsey (Jay's dad), the Ranch features both on- and off-road tracks, and it's the first track to have turned a profit. Over the years, the track has been enlarged from 1,500 to 6,000 square feet. Major events held at the Ranch have included the inaugural ⅛-Scale Worlds in 1977 (and the '87 race as well), and the first-ever ⅒-Scale IFMAR Off-Road Worlds in 1985, and the ⅒-Scale On-Road Worlds in '92.

RANCH PIT SHOP RACEWAY, POMONA, CA

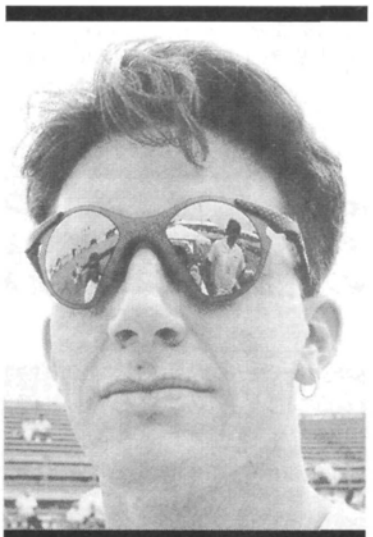
Top 10 DRIVERS

Picking the Top 10 best R/C drivers was tough; there are so many good drivers out there that it was hard to narrow them down. But, never ones to slack off when we have a job to do, we persevered. Based on their performances over the past year, these are our Top 10 drivers (in no particular order).



JOEL **JOHNSON**

Right now, Joel is the dominant force in 1/10-scale on-road racing. Joel's most recent addition to his list of wins is the IFMAR On-Road Worlds that were held in July '92. Joel won the '91 Cleveland Indoor Champs, and he TQ'd this year's event as well. Unfortunately, bad luck in the first turn kept him out of the winners' circle. Joel also TQ'd at the '92 ROAR 1/12-Scale 4-Cell Indoor On-Road Nats, he TQ'd and won the 1/10-Scale Invitational Speedworks Sportsman Cup Race and he won both the 1/12- and 1/10-Scale Modified Classes at the ROAR On-Road Nats in Florida. Not a bad year, huh?



KYLE **REED**

Team Losi's Kyle Reed has been on a tear lately, qualifying second at the Off-Road Nats and winning the Stock Class at the ROAR Truck Nats. Kyle works at Team Losi in the R&D department (mostly working on his mountain bike) developing new products. Kyle's list of wins is extensive; his 2WD Stock and Modified victories at the '91 ROAR Off-Road Nats and his third overall finish at the '91 IFMAR Worlds top it.

Pistol-packin' pros

J.D. **BECKWITH**

Look out for this guy! Team Associated's J.D. Beckwith made a name for himself by winning the 4WD Modified Class and qualifying second and placing fourth in the 2WD Modified Class at the Off-Road Nats in Dallas. Another big finish for J.D. was placing second overall at the '92 Reedy Race of Champions.

MARK **PAVIDIS**

Team Associated's Mark Pavidis is quickly proving that he has what it takes to be counted among the best of the best in R/C racing. Mark took control of the 4WD Modified Class at the ROAR Off-Road Nats by top-qualifying and placing second overall. Mark also had a strong showing at the '92 ROAR Truck Nats, where he took his 10T to the winners' circle in Modified, and finished second in the Stock Class. Mark also placed a respectable seventh overall at the Reedy Race of Champions. He's definitely a racer to keep an eye on.

BRIAN KINWALD

If you ask all the top drivers who the most consistent driver around is, most of them will agree that it's Brian Kinwald. Brian had a strong showing at the '92 Off-Road Nats, as he dramatically won the 2WD Modified Class and TQ'd and placed second in 4WD Modified. Brian also placed a spectacular third overall at the Reedy Race of Champions, and he secured fourth place overall in the 2WD Modified Class at the Florida Winterchamps. Expect more great performances from Brian.

TONY NEISINGER

Heading up the newly formed Team Point Blank, Tony Neisinger is one of the fastest—if not *the* fastest—1/12-scale-car racers out there. Tony is the current IFMAR 1/12-scale World Champion, and he recently won the 1/12- and 1/10-scale Expert Modified NORRCA On-Road Nationals in San Diego. Also to his credit: second in the '92 ROAR 1/12-Scale 4-Cell Indoor On-Road Nats; third overall at the IFMAR 1/10-Scale Worlds in Pomona, CA.

Team Associated's Cliff Lett is definitely multi-talented. As an ex-Yamaha motocross motorcycle mechanic, Cliff has transferred much of his tuning and technical knowhow into R/C. Cliff left Yamaha in 1987 to become a full-time R&D manager at Associated Electrics. Nicknamed the "Buggymaster," Cliff has shown the R/C world his driving versatility; he usually places in the A-Main in any race he enters. Cliff's recent accomplishments include winning the 2WD Modified Class at the Florida Winter Champs, placing fourth overall at the Reedy Race of Champions and winning the Pro Superspeedway event at the '92 Thunderdrome. Put a controller in his hand, and watch out!

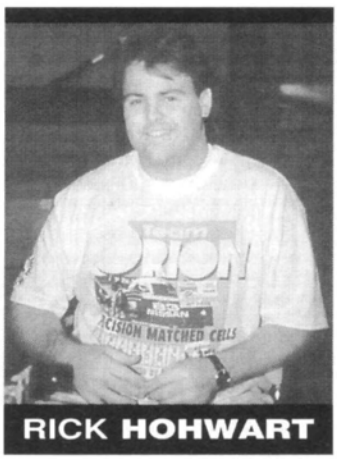
CLIFF LETT

Kris Moore's name may not be familiar to you, but it should be. A driver for Team Kyosho, Kris is arguably one of the fastest 1/8-scale gas 4WD buggy racers in the country. At the Detroit Gas Challenge, Kris destroyed the competition in the 30-minute A-Main and walked away with the first-place trophy. Kris also had a good showing at the Reedy Race of Champions where he placed 13th overall, and at the Winterchamps, where he earned third place overall in the 4WD Modified Class.

KRIS MOORE

RICK VEHLOW

Team Traxxas driver Rick Vehlow is a force to be reckoned with. As soon as he hits the track, he's a threat to the competition. Piloting his TRX-1, Rick TQ'd the 2WD Stock Class, then went on to win it convincingly at the ROAR Off-Road Nats in Dallas. Rick was also the TQ at the '92 ROAR Truck Nats in Savannah, GA, but bad luck in the Mains kept him out of the winners' circle. His other notable finishes include placing 12th at the Reedy Race of Champions and fifth overall at the Florida Winter Champs in the 2WD Modified Class. Look for more from Rick soon.



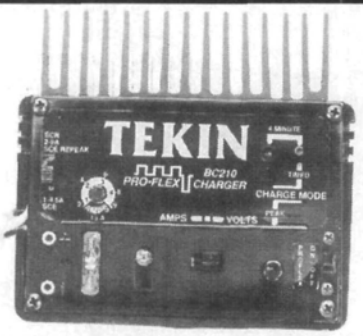
RICK HOHWART

Peak Performance guru Rick Hohwart is also considered by some to be one of the most consistent R/C racers around. Rick took first place overall at the '92 Reedy Race of Champions and placed second in 4WD Modified at the Florida Winterchamps. At the '92 ROAR Truck Nats, Rick finished an impressive second overall in Modified and third overall in Stock.

Top 10 GIZMOS

R/C GIZMOS! We can't live without 'em. These are the hot items that catch your eye as you walk past the display case of the hobby shop. Then you say to yourself, "I need that!" Well, here are 10 gizmos that make *us* say "That thing is way mongo cool. It's much cooler than my Sharper Image Salad Shooter. If I don't get that, I'm going to have a cerebral hemorrhage!" Well, maybe we're not that extreme, but these gizmos definitely are!

TEKIN ELECTRONICS



Tekin's BC210 uses exclusive negative-pulse-charge circuitry to lower the internal resistance of all Ni-Cd cells, and this measurably increases the voltage output under load. It can allow SCRC cells to deliver more power to stock motors, and with it, you can recharge packs all day with very little performance loss. Tekin's special negative-pulse-charge process applies 12A current-limited high-frequency "soft pulses" in the forward direction, then momentarily applies a negative pulse to chemically condition the cell, giving it more punch.

BC210 PRO-FLEX CHARGER

MARUI

GODZILLA

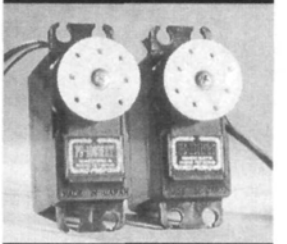
The Marui Godzilla is perfect for those who love "B" monster movies. He stands a whopping 22 inches tall and is 49 inches long. Not only does Godzilla walk, but he also shakes his head from side to side, opens and closes his mouth, wags his tail and bellows. Too bad he doesn't come with nuclear breath.

NOVAK

Novak's newest speed controller, the HPc has HyperFet transistors for ultra-low resistance. It has adjustable current limiting, 2500Hz high-frequency pulse-width modulation for more efficient battery recharging during partial throttle and solid-state reverse-voltage protection. The HPc uses 12-gauge power wires, it has 100 amps of braking power and it has a current rating of up to 300 amps.

HPC SPEED

KO PROPO



1001 & 1003

The 1001 and 1003 KO Propo servos are the fastest, strongest racing servos on the market. The 1001 high-speed servo, which weighs 1.8 ounces, has an incredible transit time of .07 seconds and 90 ounce-inches of torque with six cells (104 ounce-inches with seven). To ensure a smooth mesh, it has nylon gears. The 1003 servo, which weighs 2.2 ounces, is almost the same as the 1001, but it has metal gears. With a 6-cell battery, the 1003 has 110 ounce-inches of torque; with a 7-cell, you get 137. So if you're looking for the ultimate high-speed servos, look no further.

COMPETITION ELECTRONICS

TURBODYNO

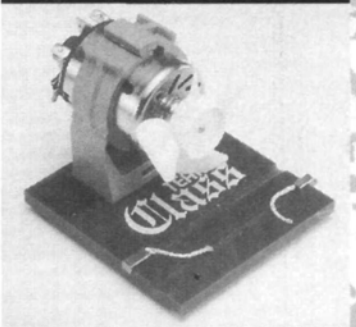
The Competition Electronics TURBOdyno will set efficiency while the motor is running, a feature that will extend run time. A 5 percent increase in motor efficiency will yield 15 seconds of extra run time on a 300-second pack. You can check the effects that brush and spring changes have on rpm, amps, torque and watts up to a 30A load (45A option—$100). The TURBOdyno checks motor performance and tells you which motors are your best, so you don't waste valuable track time figuring it out yourself. For printouts, a Hewlett Packard printer is available for $125.

PARIS RACING

YELLOW JACKET TEMPERATURE GUN

The Paris Racing Yellow Jacket infrared temperature probe is made exclusively for Ron Paris, and it was designed especially for use with R/C engines. This is the only temperature-sensitive unit that has a microprocessor-based heat-emission sensor—a must for accurate readings. The Yellow Jacket temp gun comes with detailed instructions and a carrying case with a belt loop.

CLASS RECREATIONAL PRODUCTS INC.

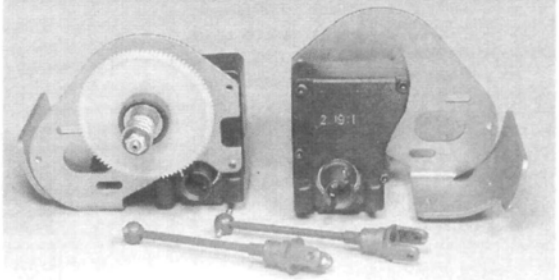


MOTOR-MAINTENANCE CENTER

The Class Motor-Maintenance Center is a convenient workshop that makes motor tuning easy. A strong, solid clip holds the motor on the stand, which has slots for custom brushcutting. There's also a handy magnetic strip that can hold your motor screws, springs, etc. Use the small Turbo Prop fan during break-in to keep your motor cool.

Just add water

TEAM LOSI



DOUBLE-X TRANNY

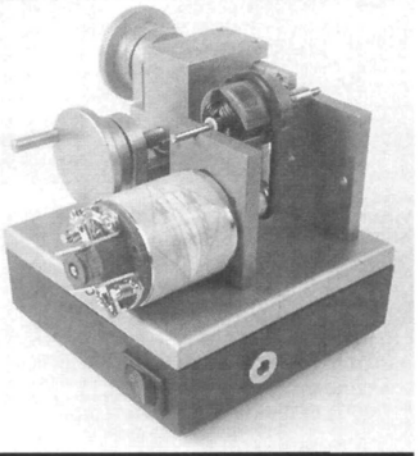
The Double-X tranny debuted at the '92 ROAR Truck Nats, and it fits directly into your existing Losi buggy or truck. The lightweight Double-X tranny has a low CG and a low drag coefficient, so your vehicle will have straighter starts, quicker acceleration and longer run times. Included in the Double-X package are extra-wide, precision-tooled gears, tungsten carbide "hard balls," a grooved thrust-bearing assembly and an easy-to-adjust diff. The tranny comes in two ratios—2.61:1 (truck), 2.19:1 (buggy)—and will accept the Hydra Drive.

SERPENT

CENTAX CLUTCH

The fully adjustable Centax Clutch system, which is available for both 1/10- and 1/8-scale Serpent gas cars, uses a one-piece carbon friction disk. The only difference between the two systems is that the 1/10-scale clutch has a lighter spring, so the clutch engages more quickly; the Centax clutch provides a 25 percent increase in usable torque from the engine, and it fits all 3.5cc car engines that have Serpent-style crankshafts. The Centax Clutch system comes in 4 single-speed and 5 two-speed clutch bell units.

TWISTER MOTORS



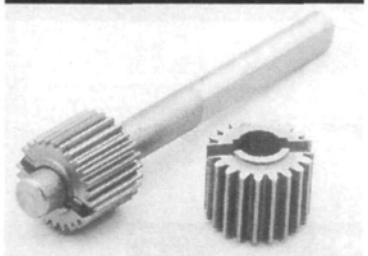
STOCK MOTOR MINI LATHE

With this lathe, you can get double, triple and even quadruple the racing life from your motors. This lathe operates on the same basic principle as the Twister Mini Lathe, but uses a long-nosed diamond cutter to true the armature while it's still inside the motor. The lathe is made entirely of metal. If you already have the Twister Mini Lathe, you can convert it to a Stock Motor Mini Lathe with Twister's adapter.

Top 10 BOLT-ONS

When it's time to spend money on after-market parts for your car or truck, you need to know which parts will provide the best performance in relation to their cost. This can be tough to determine, so we've taken some of the guesswork out of it and have come up with our Top 10 Bolt-ons. Take our word for it, these items will do lots to spice up your R/C action. OK, so technically speaking, they all don't actually bolt on to your car or truck, but you know what we mean.

THORP



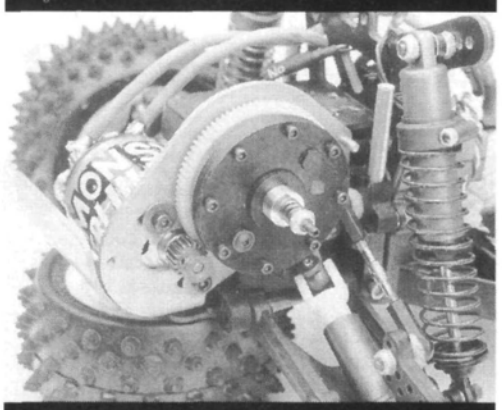
STEALTH ADAPTER SHAFT

This shaft will enable you to adapt the Losi Hydra Drive and slipper clutch to your Stealth transmission. It can be used with the Thorp 64-pitch gear and the 64-pitch top gear, or with the stock 48-pitch gear and the Thorp 48-pitch top gear.

Part nos. 4767; 4775 (adapter shaft with 48-pitch top gear); 4770 (adapter shaft with 64-pitch top gear).

Prices: $9; $17.50; $18.

TEAM LOSI



HYDRA DRIVE

This hydraulic-power transmission system works with the standard Losi friction slipper, and it uses an impeller and thick fluid to regulate motor torque. This enables you to run the friction slipper more loosely than usual, and it allows for much more traction on slippery surfaces.

Part no. A-3100

Price: $29.95

TRINITY

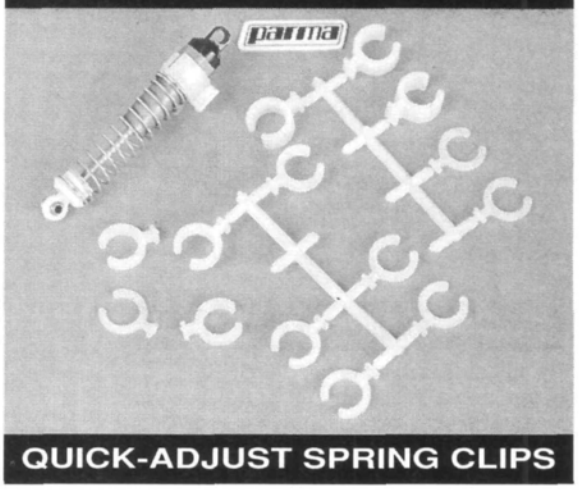
RCS FRONT SUSPENSION

The Trinity front end that was used to win the 1/10-Scale IFMAR Worlds is now available as a kit! It can be bolted directly to your 1/10-scale Associated or Bolink on-road car, and it has infinitely adjustable camber and caster. To boost low-speed steering, it can be set to automatically decrease caster as the suspension is compressed. It's available in super-speedway or standard versions.

Part nos. EV0011 (standard); EV0012 (super-speedway).

Price: $79.95

PSE



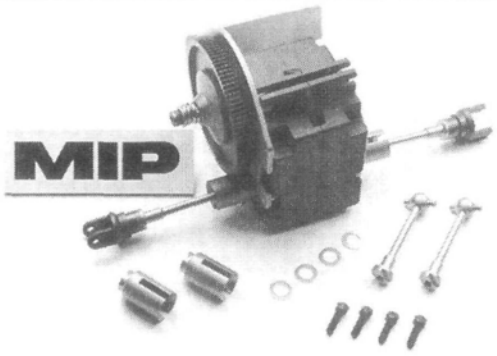
QUICK-ADJUST SPRING CLIPS

These quick-change shock collars from PSE make tuning your off-road car to any track conditions a breeze. Simply put the desired number of shims between the shock's spring and its top to determine ride height. They work with Associated, Kyosho and Schumacher shocks. Two trees include four sizes made of durable, light, injection-molded nylon.

Part no. 96150

Price: $4.95 for 16

MIP

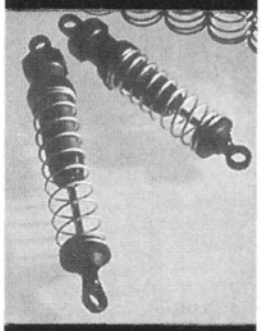


BONES FOR LOSI GEARBOX

Even the factory Losi team uses MIP bones on its standard JRX-Pro SE gearboxes. MIP Bones give better acceleration overall, and their low-friction operation allows the rear suspension to work more freely—advantageous on very bumpy tracks. MIP Bones can be installed in minutes. They're also available to fit the Losi LX-T.

Part no. MB-100
Price: $28/set

KYOSHO

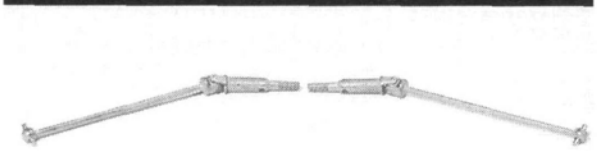


EQUALIZER SHOCKS

Kyosho's new Teflon-body Equalizer shocks have two-piece caps (a plastic mount and an anodized-aluminum nut). The plastic mount can pivot inside the nut, so there's no danger that the shock cap will unscrew accidentally during a race. The aluminum nuts might be available in different colors to correspond with different-weight shock oils. The Equalizer's seals won't swell when exposed to silicone oil, as most others do. A unique rubber dust boot slides over the lower portion of the shock body to act as a "wiper" to the shock shaft.

Hot snap-on toys

HPI

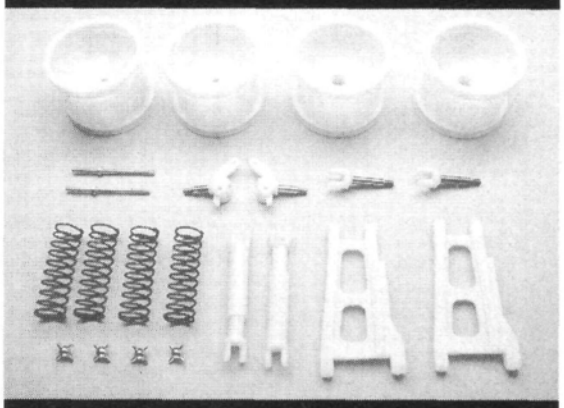


RC10T UNIVERSAL-JOINT DRIVE SHAFTS

HPI's universal-joint drive shafts replace the stock RC10T rear dog-bone and axle. The universal shafts provide smoother rotation and more efficient power transfer from the gearbox to the wheels. Also, the universals won't fall out of the truck and become lost during a race. Spacer shims are included in the package for proper positioning.

Part no. 6207
Price: $35

TRAXXAS

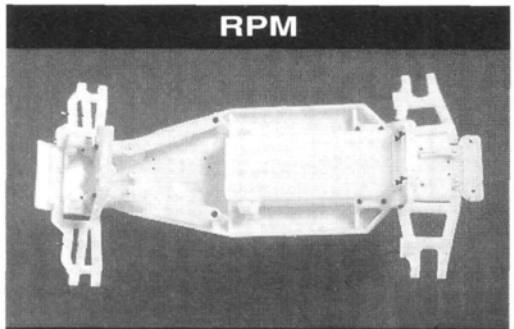


PRO-SERIES SUSPENSION

The new Traxxas Pro-Series truck suspension kit has extra-long suspension arms and shallow offset wheels, both of which increase suspension travel and stability. The new dish-shaped nylon wheels are lighter and reduce your truck's weight by 1.3 ounces. The kit includes new rear axles and four wheels. For best results, use this kit with extra-long shocks and a tall rear shock tower (no. 4704). For use on the Hawk, you'll need the long front arms (Blue Eagle LS-part no. 1931).

Part no. 1930
Price: $25

RPM

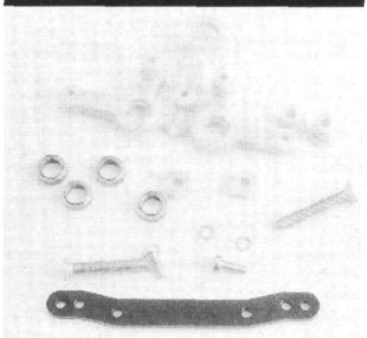


MOLDED RC10 CHASSIS

Is your old RC10 chassis bashed and worn out? Replace it with this new molded chassis that uses RPM's Worlds front and rear suspension. The kit includes ball-bearings steering bellcranks, a top battery cover and all the necessary mounting hardware.

Part no. 8080
Price: $95

A&L



KING CAB/HI-LUX STEERING KIT

A&L's bellcrank steering system is finally available for the very popular Tamiya King Cab and Hi-Lux trucks. Included with the kit are neon-yellow, 100-percent-nylon bellcranks, a composite center link, complete directions and all the necessary hardware. A&L's bellcrank steering kits improve steering and last longer than stock parts. Available with or without bearings.

Part nos. 7183 (with bearings); 7083 (without bearings).
Prices: $29.95; $15.95.

Top 10 STILL MORE

We're still getting letters about last year's "Still More Top 10." Since you liked it so much, we decided to heap more absurdities and abuse on your lousy little heads. Pay attention: it *will* be on the test.

Top 10 Articles We'd Like to See in *Car Action*

1. "The Art of the Pass," by Jack "Punt or Be Punted"Johnson
2. "Zen and the Art of R/C Maintenance," by Cliff Lett
3. "R/C Bungee Jumping," by Jay Halsey
4. "Living with Hair Weaves," by Chris Chianelli
5. "I Was an R/C Poster Boy," by Joel Johnson
6. "R/C Lip-Synching," by Milli Vanilli
7. "Where Angels Fear to Tread: A Racer's Guide to Nightclubs," by Kyle Reed
8. "The Laps of Wrath," by Chris Doseck
9. "R/C Sleepwear," by Brigitte Peugeot
10. "How to Win Friends and Influence People," by Ernie Provetti

Top 10 Allegedly Dead Celebrities Spotted at R/C Tracks

1. Elvis Presley
2. Marilyn Monroe
3. Colonel Sanders
4. Bela Lugosi
5. Jimmy Hoffa
6. Benito Mussolini
7. Vlad the Impaler
8. Sid Vicious
9. Flipper
10. Shaun Cassidy (all right, so it's just his career that's dead)

Top 10 Rejected Titles for New Magazines

1. *R/C Cattle Prods*
2. *R/C Glandular Action*
3. *R/C Leather Goods*
4. *R/C Ducks*
5. *R/C Tattoo Action*
6. *Radio Control Piñatas*
7. *R/C Prostate Surgery & You*
8. *R/C Nun Action*
9. *El Grande R/C Condiments*
10. *Radio Control Freak*

Top 10 Letters That Make Us Wonder What Planet Some of You Come From

(We left the spelling intact. Didn't any of you finish fifth grade?)

1. "I don't know what happened, but somehow I ran over the transmission." *(R/C lesson number one: Tranny goes on car. Car goes on track. Car does not go on tranny, nor does track go on car.)*

2. "Frank Masi is my idle." *(We know he's lazy, but he's the only executive editor we've got, so you can't have him. Chianelli's our idol—but we're willing to share.)*

3. "Whenever I jump, I pop them off." *(Quick! Pack them in ice and get to a doctor!)*

4. "And you know somthing? I would like to know somthing allso." *(We're sure you would. When you figure it out, be sure to write to us again.)*

5. "If I send you my ol car, will you send me a new?" *(Oh, sure. No problem.)*

6. "How come you pick on Chianelli all the time?" *(Easy target, just like you.)*

7. "What kind of motor should I—" *(Stop right there or we'll have to rip your lips off.)*

8. "Can I have that Inferno/RC10T/ Nitro Crusher when you finish reviewing it?" *(Didn't we tell you last year to stop asking? The answer is still no. Now go to your room and repeat, "I shall not covet the authors' goods" forty thousand times.)*

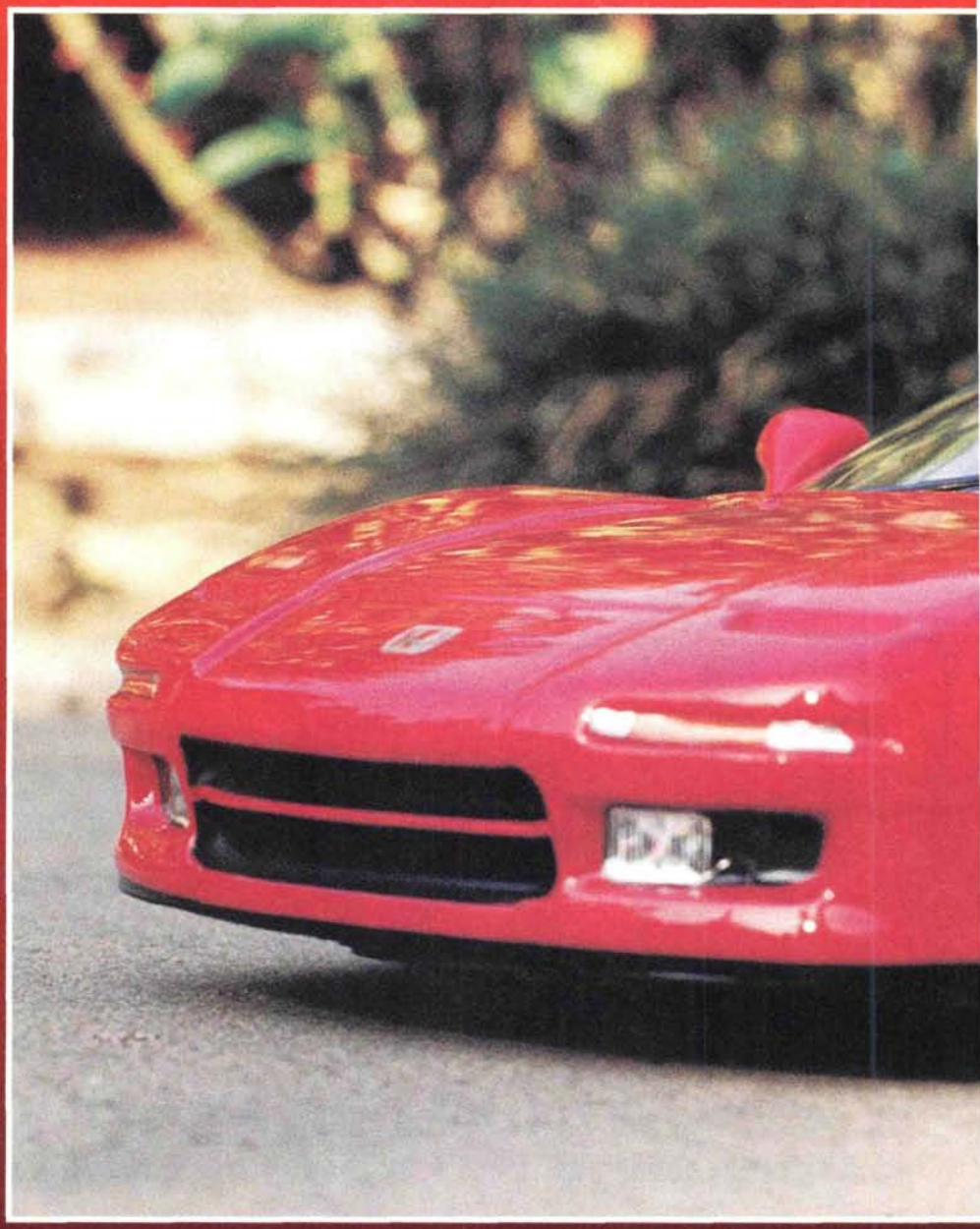
9. "Write back and tell me which issue you're going to print my letter." *(Send cash; we might consider it.)*

10. "Don't I get a free subscription for finding a mistake?" *(Nope. In fact, we might even cancel your existing subscription for being obnoxious.)*

CAR ACTION TRACK REPORT

by GEORGE GONZALEZ

WE HAD our first glimpse of the full-scale Honda NSX at the '89 Chicago Auto Show. It's a smooth, fast, high-performance luxury sports car, and it doesn't come cheap. From Acura, in the U.S., the car carries a $65,000 price tag, but you'd be lucky to get one for less than $100,000. The waiting list for them is long; even here in Southern California, I rarely see one.



YOKOMO HONDA N

Honda racing technology is apparent in the NSX's fantastic handling. It's powered by a potent 3-liter DOHC V-TEC engine. To keep its weight down almost to that of a racing car, many of its body and suspension parts are made of light aluminum. To complete the package, the NSX has a beautiful, sleek, head-turning, aerodynamic body.

The $100,000 asking price gave me a severe case of sticker shock, so I decided that Yokomo's* new 1/10-scale Honda NSX would be my best bet. With Yokomo's Honda NSX Super-Scale R/C car kit, you get attention to detail and high performance—a beauty-and-the-beast combination!

THE BEAUTY

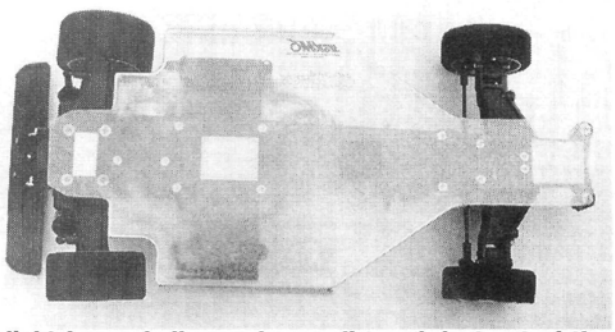
With its side mirrors, windshield wipers, license plates, tail pipes, air intakes, rear spoiler and full front and rear ornamentation, the body captures the raw excitement of the full-size NSX. To further enhance its scale appearance, it also has a realistic interior with a driver, a rearview mirror, gauges and a center console. The front and rear wheels are carefully detailed, and like those on the full-size car, the rears are wider than the fronts. The body is mounted with Velcro® instead of body posts, and the receiver antenna is under the body.

NSX

—THOU SHALT SPEED

THE BEAST

The beautifully sculptured body hides a lean, mean racing machine. Despite its narrowness, the NSX's light, reinforced FRP (fiberglass-resin plate) double-deck chassis is surprisingly stiff. Its 4W, independent, double-wishbone suspension has four high-quality, oil-filled aluminum short-stroke shocks mounted on four short A-arms give the NS-X about ½ inch of ground clearance. Compared with that



A light Lexan belly pan keeps dirt and dust out of the chassis. This pan also acts as a body mount.

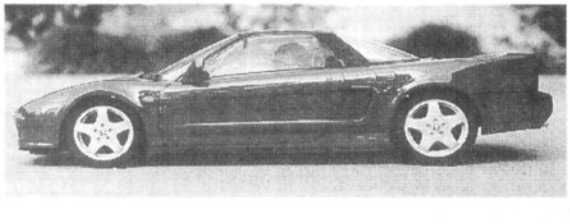
of an average on-road car, the ½ inch of ground clearance might seem a lot, but it allows the car to smoothly take bumps that would launch a conventional on-road pan car into space.

Adjustable front and rear control links allow camber to be adjusted easily; the front end has a fixed 5 degrees of positive caster, and the rear end has a fixed 2 degrees of toe-in. Yokomo's ever-popular steering bellcrank and adjustable servo-saver make steering precise, and four medium-compound foam tires provide the traction.

The NSX has a mid-motor layout. The motor is mounted directly in front of the right rear A-arm on a finned aluminum motor mount that acts as an effective heat sink. To compensate for the weight of the motor on the right side, the battery compartment, which is directly in front of the motor, is offset to the left.

Power is transferred smoothly to the tires by a Kevlar drive belt that runs from the motor to the center-mounted, competition-type gear diff and universal-joint drive shafts. A full set of bearings tops off this high-performance package. The NSX's front end has a unique shock-absorbing (crash-absorbing!) system: a urethane front bumper and pivoting A-arms, which are designed to minimize impact damage. To keep out the dirt, a light Lexan "tub" is attached to the underneath of the chassis; this also acts as a body mount.

YOKOMO HONDA NSX



Scale 1/10

DIMENSIONS:
- Overall length ..... 17.4 inches
- Width ..... 7.1 inches
- Wheelbase ..... 9.9 inches
- Front track ..... 6.2 inches
- Rear track ..... 6.25 inches

WEIGHT:
- Gross (with battery) ..... 3 pounds, 3 ounces

BODY:
- Type ..... Two-door sports car
- Material ... Polycarbonate with plastic detail parts

CHASSIS:
- Type ..... Double-deck plate
- Material ..... Reinforced "FRP"

DRIVE TRAIN:
- Primary ..... Pinion-and-spur
- Transmission ..... Direct Kevlar drive belt
- Differential ..... Gear
- Bearings/bushings ..... Bearings

SUSPENSION:
- Type (f/r) ..... A-arm with adjustable upper link
- Damping (f/r) ..... Oil-filled, coil-over shocks

WHEELS:
- Front: Type ..... One-piece plastic
- Dimensions (D&W) ..... 1.75x.75 inches
- Rear: Type ..... One-piece plastic
- Dimensions (D&W) ..... 1.87x1.25 inches

TIRES:
- Front/Rear ..... Green-dot foam

ELECTRICS:
- Motor ..... Not included
- Battery ..... Not included
- Speed controller ..... Not included

OPTIONS TESTED:
Airtronics XL 2P transmitter with a standard 94102 servo; Tekin TERX 75 mini-receiver; Tekin 610-R ESC; PTI 6-cell matched 1400 SCR battery pack; Peak Performance Renegade 40-degree stock motor; Associated .040 short off-road springs, clamps and cups.

HITS:
- Beautifully sculptured body
- The high-quality parts make the NSX easy to assemble
- Race-car performance in a well-detailed wrapping

MISSES
- Should have a ball diff (it has everything else!)
- Tiny front springs are inadequate

FIRST IMPRESSIONS

Right from the start, I knew that building the NSX would be interesting. Why? The instruction manual that came with the kit was written in Japanese. I happily put up with this slight inconvenience because I was pleased to get this prototype. The instruction manual has plenty of excellent pictures and illustrations that match the usual numbered bags, so building the NSX was no different from building any other car. And I finally had an excuse to build without reading the instructions!

SHOCKING TRUTH

The supplied aluminum shocks are of a good quality, and when properly set up, they provide more than enough damping for this light car. I do wish, however, that Yokomo had included a set of standard front springs instead of the tiny shaft springs that came with the kit. The supplied springs are about the same size as the floating-kingpin-type springs found on pan cars, and they're installed on the shock shaft instead of on the shock body. Unfortunately, they didn't quite cut it because, even without the battery, the front end rested on the ground.

I installed a set of Associated* short .040 springs (black) on the front shocks and filled the shocks with the supplied shock oil. The car then had the proper front ride

height, and the springs provided extra-smooth damping.

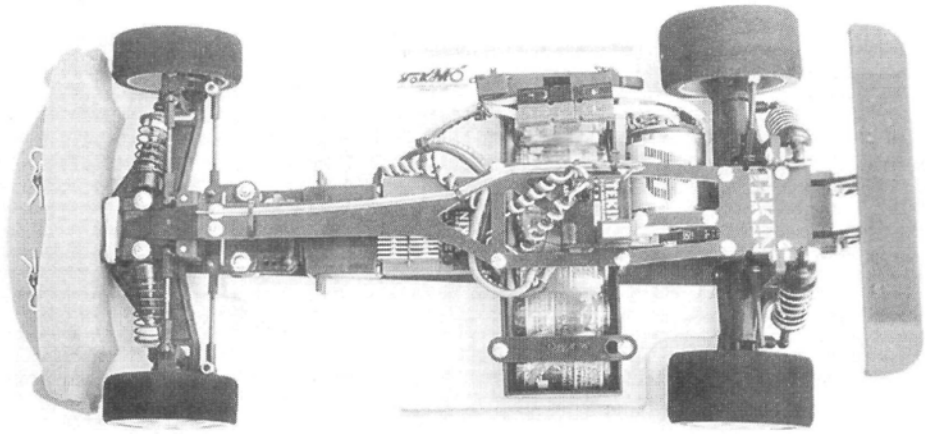
DIFFERENCE OF OPINION

It's easy to build the gear diff; to ensure a smooth operation, be sure to put plenty of grease on the steel gears. (I used all the grease that came with the kit.) At first, I was really bummed that Yokomo hadn't included a competition ball diff on this otherwise high-performance R/C car. The rear independent suspension provides plenty of traction, however, so the "slip" characteristics of a conventional ball diff aren't really necessary. The gear diff on the NSX is one of the best I've ever tested.

Building the rest of the car was more like building an off-road car than an on-road car; in fact, the NSX's chassis is very similar to the chassis of a dirt-oval race car.

Finally, you mount the rims and foam tires. I think Yokomo should have included chromed-plastic rims instead of the dull gray ones they included. Although the rims are detailed and look good on the car, chromed rims would give the car that "concours look." I was faced with a choice: should I paint the rims or not? I decided not to because with use, the paint would be chipped away.

Yokomo suggests that you mount the foam tires on the rims with easy-to-apply adhesive strips. The strips hold the tires securely enough, but I decided to stick with tradition and glue the tires on the rims with contact cement.



PHOTOS BY GEORGE GONZALEZ

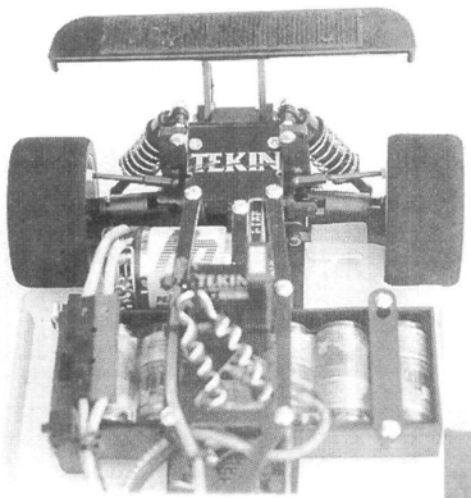
The NSX's motor is mounted directly in front of the right rear A-arm on a finned, aluminum motor mount. To compensate for the weight of the motor on the right side, the battery compartment is offset to the left.

Overall, building the chassis was a breeze. All the parts went together very well, and because I didn't have to do any reading, I found I completed the car in less than four hours.

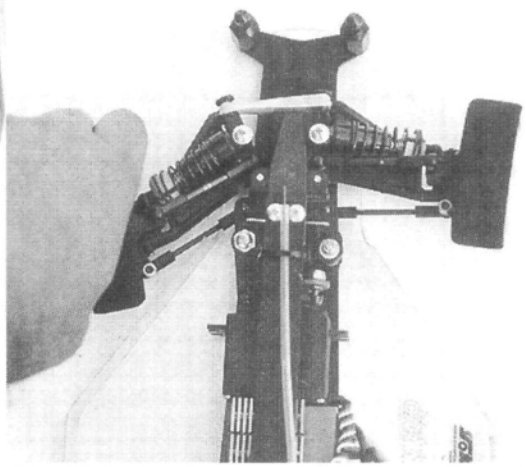
ELECTRICS

For this realistic-looking, high-performance car, a high-frequency, reversing speed controller (ESC) is a must. With its fully proportional forward, brake and reverse, the Tekin* 610-R is perfect for the job. It has an adjustable reverse time delay that lets you decide how long it should be before reverse kicks in (0 to 5 seconds). If you prefer, you can bypass reverse.

The 610-R is almost twice as big as a conventional ESC, so it's a very tight fit. I team it with a Tekin TERX 75 mini-receiver. To supply the ponies, I installed a Peak Performance* Renegade stock motor and a PTI* 1400 matched 6-cell battery pack. Steering and throttle control are provided by my old favorite, the Airtronics* XL 2P radio and 94102 servo.



Power is transferred smoothly to the tires by means of a Kevlar drive belt that runs from the motor to the center-mounted, competition-type gear diff and universal-joint drive shafts.



The NSX's front suspension features this unique shock/crash-absorbing system. A urethane front bumper and pivoting A-arms are designed to minimize crash/bump damage.

WHAT A BOD!

The NSX's polycarbonate body is by far the best looking body I've ever seen on an R/C vehicle. The plastic detail parts almost make you want to display it rather than drive it.

I gave the task of painting the body to Scott Rapoport of "Paint: by Scott." He did an awesome job; look at the detailed interior! Following the photos on the box, the car is a fire-engine red and has a jet-black top. Rapoport gave the driver a red-white-and-blue fire suit—very patriotic!

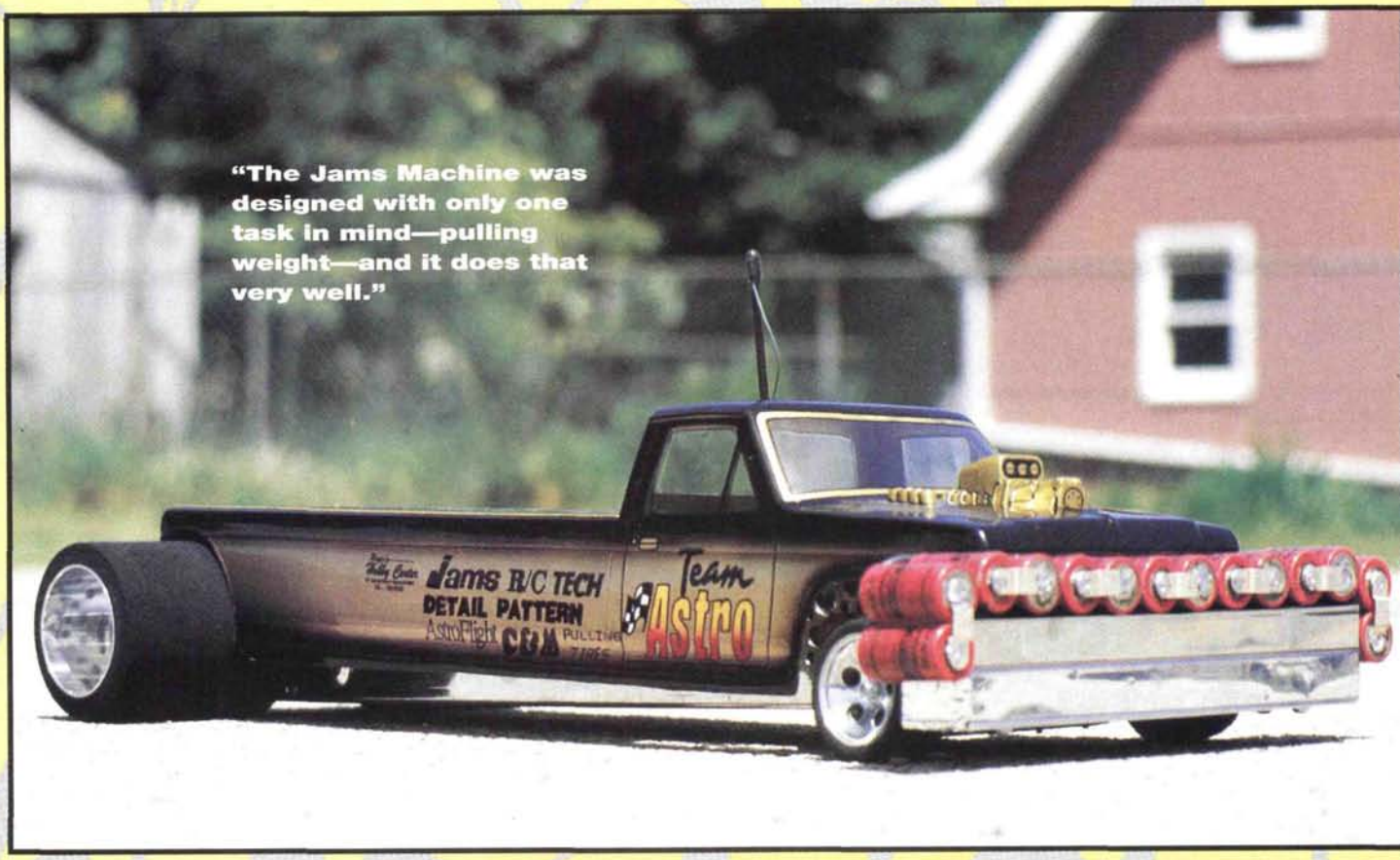
The kit's decal set includes Honda logos in a variety of sizes for the rims and the hood, a beautiful set of "gauges," a "center console" for the interior, front and rear ornamentation and mirrors.

PERFORMANCE

I decided to stray from the traditional track testing with all its clocks, dynos, and tire truers and to test the car on what most R/C enthusiasts will drive this car on—streets, driveways and parking lots. After a few slow passes to get all my trims in order, it was time for some serious tire-spinning, body-sliding fun. When I hit the throttle, the car shot away like a bullet out of a revolver. With its fixed 2 degrees of toe-in, the car's independent rear suspension really kept the car running straight during hard acceleration.

Thanks to its lightness and low-friction

(Continued on page 148)



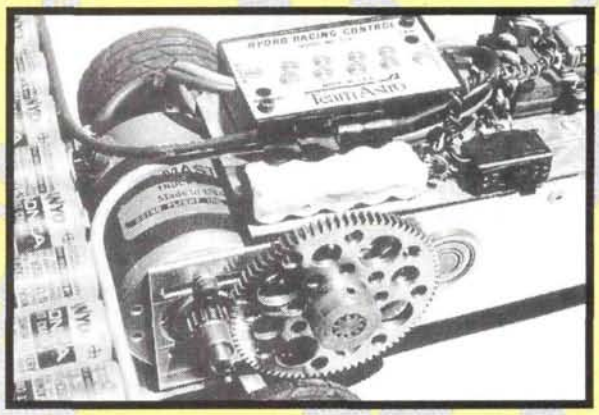
"The Jams Machine was designed with only one task in mind—pulling weight—and it does that very well."

Jams machine

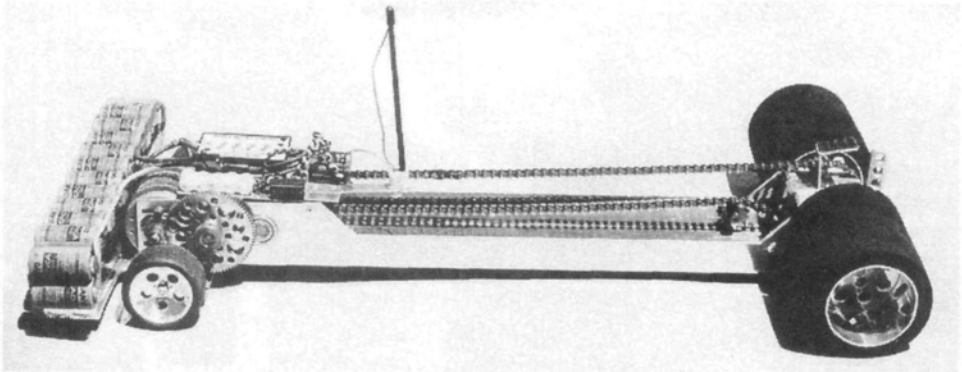
by DAVE SPROUL

MANY SPECIALLY designed R/C pulling trucks have become available in the last few years and the Jams Machine is the newest one. Designed by Mike Cole of Jams R/C Tech*, the Jams Machine uses technology that Cole learned from years of pulling experience.

Cole describes the chassis as a front-loader (or weight-forward) design. This means that the motor, the gearbox and the radio components are mounted on the front of the chassis, and this allows a good weight transfer as the truck pulls the sled. The chassis was designed specifically for the Astro Flight* Pullmaster IV Cobalt motor, but it will accept any motor.

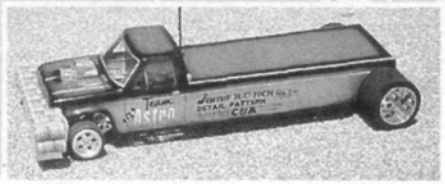


Heavy-duty steel gears deliver the power of the Astro Flight Pullmaster IV motor to chain drive system. The chain turns the rear wheels.



The efficient chain drive transfers power to the rear wheels. The idler sprocket prevents slop in the chain.

SPECIFICATIONS



Chassis	Machined aluminum
Gears	Steel
Bearings/bushings	Ball bearings
Length	24 inches
Width	11 inches
Height	4.5 inches with body
Weight	15 pounds (fully loaded)
Ratios	54:1 to 181:11

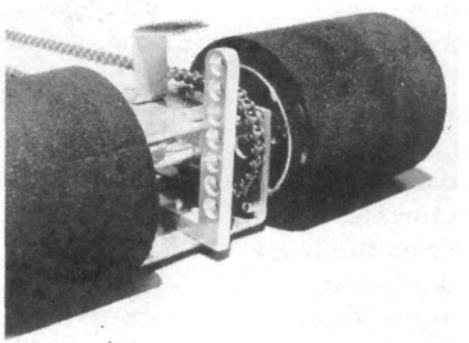
OPTIONS:

Motor	Astro Flight Pullmaster IV
Speed controller	Astroflight 207
Battery	Custom 14-cell saddle pack
Tires	C & M pulling tires
Wheels	C & M polished aluminum
Lightened gears	Jams R/C Tech
Body	Parma* Ford puller
Radio	Futaba* Magnum sport
Receiver	Tekin*

The bulletproof gearbox has large steel gears that run on ball-bearing-supported shafts and connect the heavy-duty roller-chain drive to the rear axle. The drive chain also incorporates an idler sprocket to act as a chain tensioner.

Gear ratios can be easily changed by changing the motor pinion. The rear axle also rides on ball bearings, and it's attached to special C&M* pulling tires and machined-aluminum wheels.

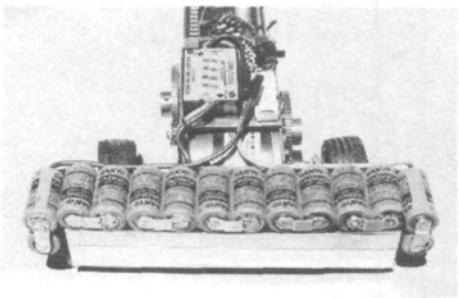
In the front, the chassis is supported by an aluminum axle and special wheels and tires. The weight bar is mounted in front of the body, and it also supports the 14-cell battery pack. Although the Jams Machine was designed primarily for the NRCPTA's Open I class competition, it can be adapted for the Sportsman Class by changing its weights, batteries and motor.



A machined-aluminum rear hitch has several hookups for the sled chain.

"If you're serious about R/C truck pulling, this is the machine for you. Check it out! "

The truck that I reviewed was completely built and ready to run. Its construction was of a very high quality and every part performed flawlessly. Unfortunately, I didn't have an opportunity to test the truck in pulling competition, but, having seen Cole pull at various national events, I'm confident that this will be a very competitive truck.



The "weight-forward" chassis places the motor and gearbox toward the front for better weight transfer when pulling.

The Jams Machine was designed with only one task in mind—pulling weight—and it does that very well. I won't try to analyze how much it can pull, since that depends on conditions, such as the type of pulling sled, the track conditions, etc. No matter what the conditions, though, the Jams Machine will pull with the best of 'em.

The Jams Machine is available as a gearbox and chassis, a rolling chassis, or as a complete truck. Other options and custom machine work are also available. If you're serious about R/C truck pulling, this is the machine for you. Check it out!

**Here are the addresses of the companies mentioned in this article:*

***Jams R/C Tech.**, 218 E. Saginaw St., Hemlock, MI 48626.*

***Astro Flight Inc.**, 13311 Beach Ave., Marina Del Rey, CA 90292.*

***C&M Mfg.**, P.O. Box 701-353, Nest Valley City, VT 84170.*

***Parma Int'l Inc.**, 13927 Progres Pky., N. Royalton, OH 44133.*

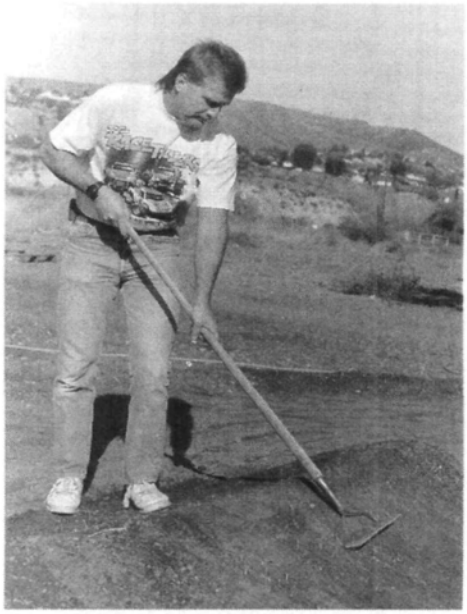
***Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718.*

***Tekin Electronics**, 940 Calle Negocio #140, San Clemente, CA 92673.* ■

HOW TO Build A Track

by A.R. FLATBUSH

...And Improve Your Driving Skills In The Process



PHOTOS BY A.R. FLATBUSH

Smooth landing ramps are important. To smooth the soil, use the back of your rake as shown.

AFTER ONE visit to a local R/C raceway, my friends and I caught the R/C car bug in a such a big way that we built a backyard off-road track before we even bought cars! We were long-time off-highway enthusiasts who knew that loading up and driving to a track could be a pain. So, we made sure that getting to the nearest facility would be as easy as stepping out the back door.

We built a replica of a Mickey Thompson Grand Prix (MTGP) track—complete with double jumps, whoops, a five-jump rhythm section, a "bowl" turn, a high-banked turn, a high-speed sweeper and a peristyle turn/jump section. Eventually, we bought cars, and the track evolved as we learned to drive, set up and maintain our vehicles. We've since built other tracks, and in this article, we share what we've learned in our quest for fun and competition.

PLANNING AND LAYOUT

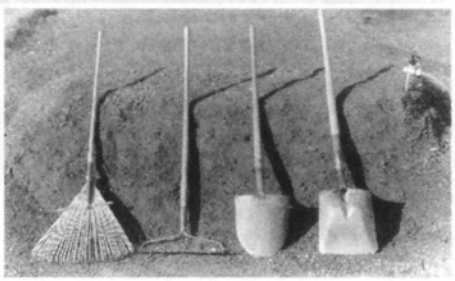
Job one is to make the best use of the space you have available. The track described earlier was only 20x30 feet! It was just 4 feet wide in places—pretty tight for even three cars, but it was all that we had room for. In comparison, ROAR-legal off-road tracks must have lanes at least 8 feet wide. MTGP tracks are generally U-shaped, because you can pack a lot into a "U."

Determine the amount of space you have available, and then sketch several track layouts on paper. Visit a motocross track or, if possible, an MTGP track for ideas. Our goal was to be competitive locally, so we incorporated the obstacles used at our local track into our designs.

If you're a novice racer, steer clear of double jumps and other difficult obstacles until you've gained some experience. Also, avoid incorporating impractical obstacles that will take up too much space or require a lot of material. Design your track so that it challenges your driving skills, yet isn't

TRACK-MAINTENANCE TIPS

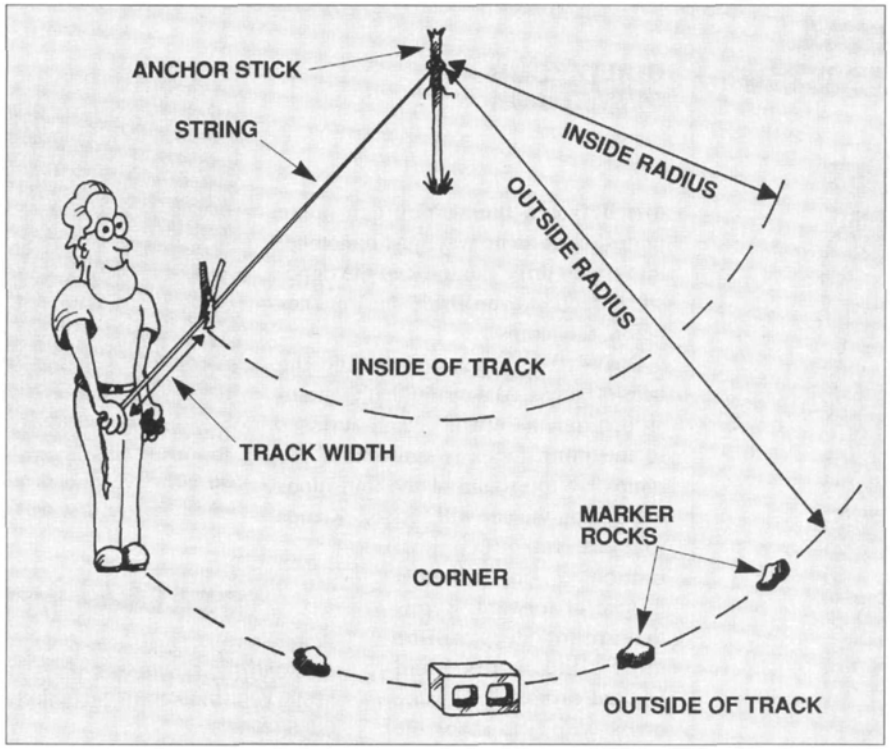
Maintenance can be fun and fast if you share it with fellow racers or the ever-present neighborhood kids. Always keep your track in the best shape possible. Here are a few tips on how to do it.



Here's the equipment you'll need to build the track (from left): a leaf rake to remove rocks and litter; a steel or aluminum rake to prepare the track surface; a rounded shovel to shape whoops and transitions; and a flat shovel to pack dirt and smooth surfaces; and a hose with a nozzle or a sprinkler. A shop broom is a good idea, too.

- Spinning tires will remove dirt from the surfaces of your obstacles, and rain will cause your jumps to slump. Resurface take-off areas using the backside of a garden rake. (You can also scoop dirt onto them with a flat shovel.) To resurface jumps and whoops, draw the dirt up with the rake, and then simply repack it.
- On dirt tracks, fill holes and fix rough, worn sections using the back of a rake. Use a broom to fill the low-lying areas with soil. Pack and water down the track after you've smoothed it.
- Filling a hole in a hard-packed clay track is more troublesome. Dump water in it, and then sprinkle soil in the water. Stir the puddle that you've created with a rake until a slurry forms. When this "patch" has dried, it will be as hard as the rest of the track.
- If your track's surface is made of hard-packed clay soil, you won't have to water it down before you race on it. Just be sure to sweep up loose soil; otherwise, the track will be slicker than Banana Lube.
- Keep loose, sandy soil moist. Not only will this prevent a dust cloud from hovering over your track, but it will also keep a lot of ugly stuff from working its way into your car's bearings and electrics.
- If you use a lot of water on your track, weeds will be a problem. Be sure to pull them. Weed poison is nasty stuff, so if you use it, follow the instructions carefully.
- Keep debris and rocks off the track and the infield. Your car can flip if it hits these obstacles, and guess who has the turn-marshalling duties?

MAKING PERFECT CORNERS



impossible to negotiate. You'll also want a clear view of the whole track, so don't forget to leave room for a drivers' stand.

Once you've sketched your blueprints, it's time to lay out the track. Mark the borders with rocks or stakes, paying close attention to the width of the lanes. You can mark the jump locations at this point.

FUN-ZONE CONSTRUCTION

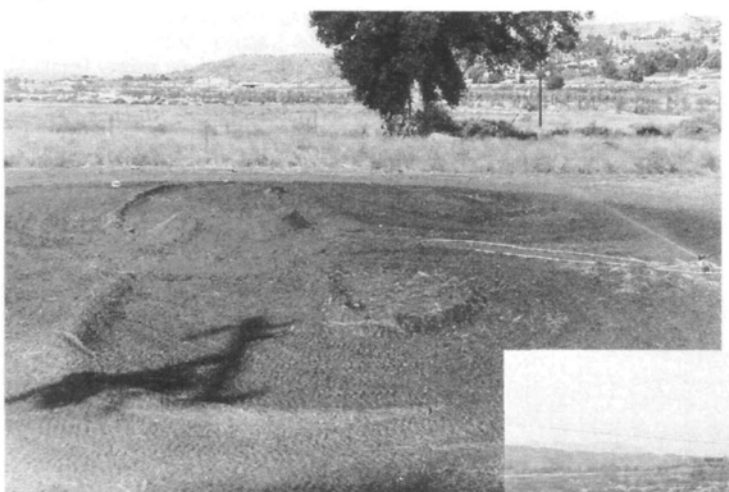
If you have to haul in dirt to make jumps and barriers, do it before you begin construction. Most of the work can be done using a few simple garden tools, such as rakes and shovels. To break up hard-packed soil, however, you might have to use a pick or a tiller. If you don't have access to such equipment, tackle the job after it has rained or you've watered the track. Then it's just a matter of raking the dirt to form jumps or berms.

Finding materials to make your obstacles is likely to be a problem. Keep an eye out for "free fill dirt" ads in the paper. If dirt is scarce, you can build obstacles using bricks, boulders, or wood that's covered with dirt. (We once used an overturned bathtub to create a table-top jump!) Be forewarned, though: these obstacles require more maintenance than those made of dirt, and exposed bricks and rocks can damage your cars.

Barriers are another concern. PVC pipe is expensive. Boards will work, but be sure that they're high enough so that your car won't flip over them. Once again, dirt is the best material to use—just pile it into barriers.

To make double jumps, build the take-off jump first. Load your car with a freshly charged battery, launch the car, and see where it lands. Build the second jump about 6 inches behind that point. This will make clearing the double jump a challenge late in a run, when your battery's power has diminished.

To make whoops, dig trenches and pile the



How far are you from the closest 1/10- or 1/8-scale R/C track? We thought so. Time to build your own!

▲ ***At tracks such as the Fast Lane in Saugus, CA, the soil is tilled and repacked with a drum before it's watered down. (The guys in the back are on rock-removal detail.)***

Once you get rid of the weeds, rubbish and rocks, it's time to duplicate your blueprints in the dirt. Improvise if you have to, but build the track "solid."

EDITORIAL OPPORTUNITY

Associate Editor

Air Age, Inc., publisher of *Radio Control Car Action* and other hobby-related publications, is looking for a creative, motivated individual who is interested in a magazine career. You'll work on *Radio Control Car Action* and related special publications and books. You must have good writing skills and some knowledge of the R/C car hobby. Experience with photography and magazine publishing are a plus. This is a great career opportunity with a fast-growing company. Send your résumé to:

Frank Masi
Executive Editor
R/C Car Action
251 Danbury Road
Wilton, CT 06897

BUILD YOUR OWN TRACK

dirt between them. You can make jumps in the same way; just remember that if you drive the track in the opposite direction, you'll hit the trenches before the jumps.

Now's the time to fine-tune the take-off areas. Make sure that the transition from the track's level surfaces to the jump faces is smooth. If the ramps are too round or the transitions too abrupt, the car will "endo." Ramps that are too steep will launch a car upward instead of forward. Berms that are too steep will be more like walls than banked turns. Use a rake or flat shovel to shape the berms and take-off ramps. Also, move jumps if you discover that you've miscalculated the distances for them.

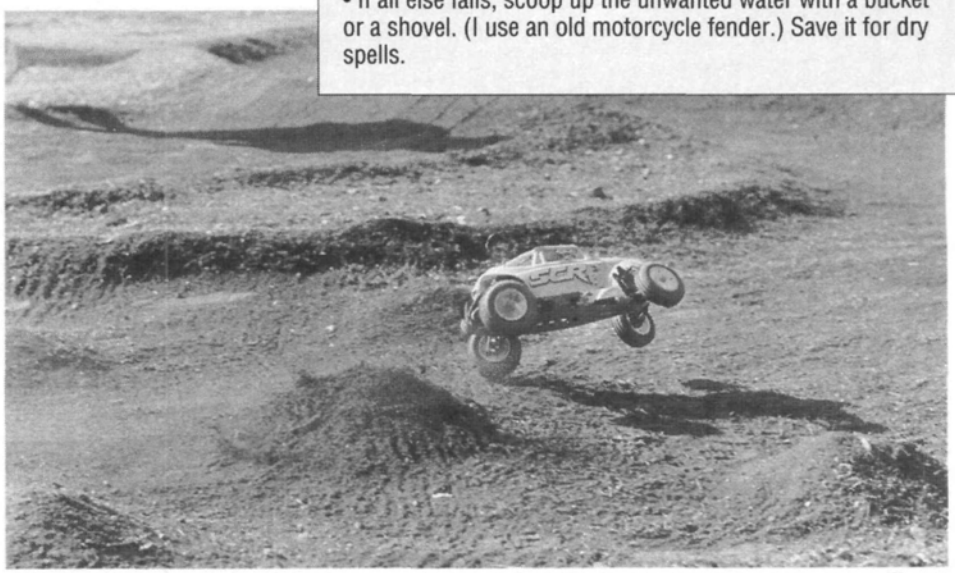
So there you have it. After some trial and error, you'll have your track up to speed in no time. Just think: you could have your own personal test area for checking out all your hot new setups! What are you waiting for? Grab a rake and a shovel and get moving! ■

The drier your track, the more it's likely to wear. Be sure to smooth and pack whoops and jumps when they're dry; wet dirt will stick to your shovel.

DEALING WITH WATER

Water is our friend: live it, learn it. By keeping your track nice and moist, you get gobs and gobs of traction. It also keeps your track from becoming a dust bowl. Get your squirt guns ready!

- Water can pack loose soil or loosen packed soil. If you don't use too much of it, you'll make it easier to drive on your track.
- The most efficient way to moisten your track is to use a garden hose with an adjustable spray nozzle attached. Sprinklers will saturate the track better, but they waste more water.
- Your track doesn't care whether you use fresh water. You can collect water by putting buckets under gutters or window-unit air conditioners.
- Removing excess water from a track can be difficult. Set up a drainage system made of small sections of PVC pipe or pieces of a hose—just be sure to lay them downhill!
- Sweep water in puddles off the track or onto its dry sections. You can syphon water out of recessed areas. Totally submerge your hose in the "pond" to get all the bubbles out. Clamp your thumb on one end and pull it over the berm; make sure that this end is lower than the one that's under water. Release your thumb, and gravity/suction will syphon the water. (Never put your mouth on a hose; spiders think of hoses as condos.)
- If all else fails, scoop up the unwanted water with a bucket or a shovel. (I use an old motorcycle fender.) Save it for dry spells.

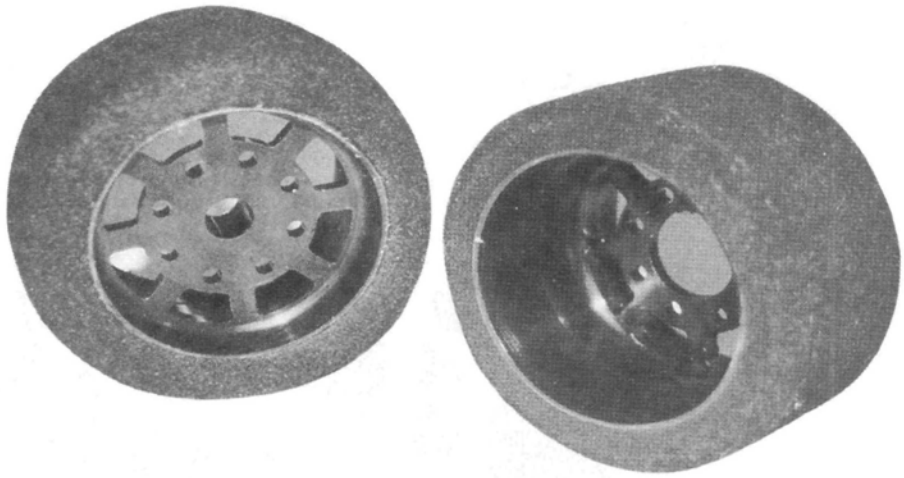


This is what it's all about. Design your track so that it's fun, yet challenging, or you'll get bored—if that's possible with R/C.

How to Mount Tires

by LARRY COLE

You can save money by mounting your own foam tires, because you won't have to buy pre-mounted tires and wheels.



foamy don't play dat!

ONE OF the most frequent complaints that I hear about R/C car racing is that it's expensive. There are ways to save money, however; you just have to take advantage of them.

Racers who run foam tires can cut costs by mounting foam donuts to wheels that they already own. For example, a set of mounted front tires will cost an average of $15 a pair, but the foam donuts only cost half that. Mounted foam rear tires cost about $18 and $9 for donuts. Did you know that for the cost of just one set of unmounted donuts, you can buy everything you need to mount several pairs of tires? So, if you want to learn how to mount foam tires and save money in the process, read on.

First, you'll need a few things. If you're running 1/12 or 1/10 scale, make sure you have a tire-mounting horn of the right size from Kimbrough Products*. You'll also need some tire glue (AJ's* Black Magic Tire Glue works well), paint thinner, a piece of 100- or 150-grit sandpaper and an empty coffee can. A tire truer would help, but you can live without it.

Coat the inside of the foam donut with tire glue and let it dry; then coat the outside of the wheel with glue and let it dry.

First, remove the old foam tire from the wheel by soaking them both in paint thinner. Pour enough thinner into the coffee can to cover the wheel, and let it sit overnight. The thinner will attack the glue that holds the tire on the wheel and, in most cases, the tire will peel off in one piece. (Don't use gasoline to loosen the glue. The fumes are dangerous.) Before you mount the new tire, make sure that you remove the entire tire and that the wheel is thoroughly clean.

To mount your own foam tires, you'll need an empty coffee can, paint thinner, a tire horn that's the right size, sandpaper and tire glue.

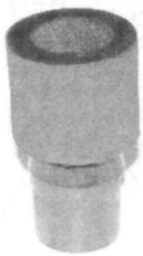
Examine the wheel for cracks, and make sure that it isn't out of round. Look for rough spots (especially if you've been involved in any wall-bashing escapades), and use a Dremel tool or a file to smooth irregularities. (I round all my wheel edges because smooth edges are less likely to cut into tires during cornering or collisions!) To remove the last

"Mounting your tires isn't that tricky; just make sure that you buy tires that are the correct size for your wheel."

bits of old glue and to ensure that the new glue will bond well, lightly sand the wheel where it will contact the foam donut. Rinse the wheel under running water, and then dry it.

Next, apply tire glue to the wheel. Make sure that the glue covers the entire outer surface of the wheel and that there's plenty of it. Then, set it aside, and don't worry that the glue will dry. Cover the new tire's inside surface with glue and, once again, don't skimp on the glue.

To mount the tire, place the wheel on its side on a flat, hard surface with the wheel's inside edge facing upward. Place a tire horn of the appropriate size on top of the wheel. Make sure that the tire horn's inner groove fits the inside of the wheel. (This aligns the wheel with the tire horn.) Put the glued tire into the coffee can that contains the paint thinner, and let it sit for a few seconds. The paint thinner acts as an accelerator for the glue and as a lubricant to allow the tire to slide smoothly over the wheel.



Once the glue is dry, soak the tire in paint thinner so that you can slide it over the rim. Use a tire horn to stretch the tire over the wheel as you slide it.

Take the tire out of the paint thinner, and place it over the horn's narrow end. Using even pressure, slowly push the tire down along the horn. This stretches the tire. Push the tire down until its top is almost at the bottom of the tire horn. At this point, the tire will be about 90 percent on the wheel. Now, quickly push the tire right onto the wheel. Remove the tire horn, and examine the tire before the thinner that's on the tire evaporates. Make sure that it's centered on the wheel, and that it extends to both the inner and outer edges of the wheel rim. If it seems to be slightly off, grasp it with both hands and, using your thumbs, slowly knead its center toward the edge it isn't yet touching as you slowly

(Continued on page 98)

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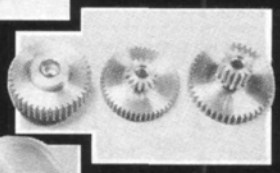
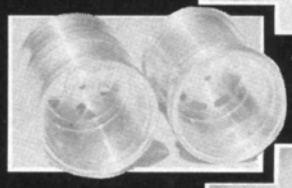


• Clod Steel Gear Set # 7050



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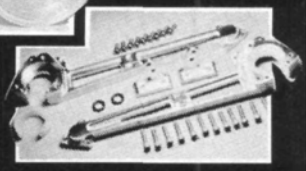

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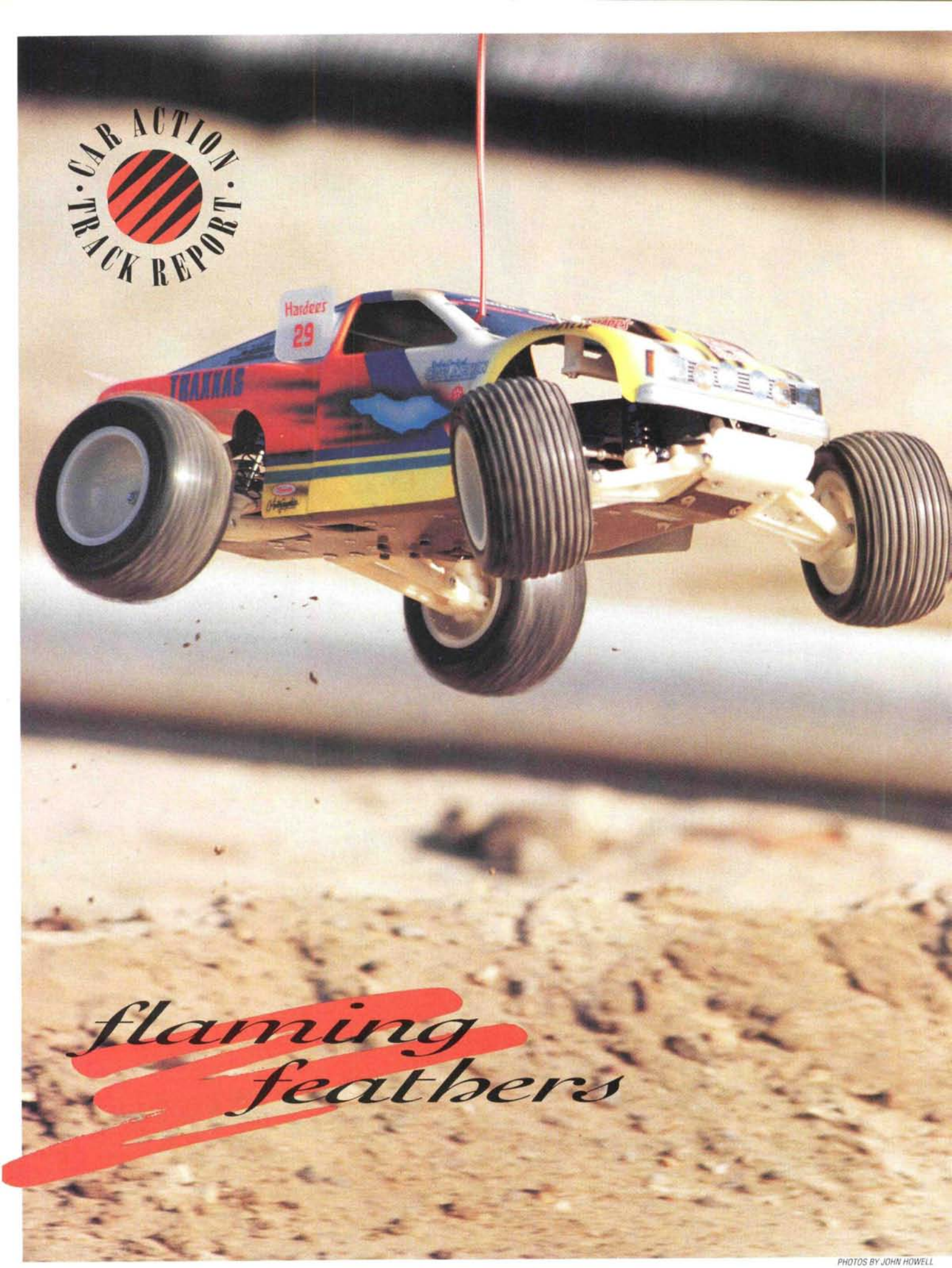


flaming feathers

PHOTOS BY JOHN HOWELL

TRAXXAS NITRO HAWK

EET'S THE Nitro Hawk, you eediot!! **Don't touch it, you fool, it's liable to go off!**

What would it take to prove to you that 1/10-scale gas is hot? What if a leading manufacturer of 1/10-scale electric cars and trucks came out with a gas-burner? How about if this hypothetical company also designed and built their very own .12 engine? That would do it, yes? **Prepare to eat methanol fumes.**

Traxxas has taken off its shoes and socks, rolled up its pant legs and waded into the world of gas cars. **The Nitro Hawk is a milestone;** it's the first gas-powered, 1/10-scale, off-road truck by an American manufacturer.

The Nitro Hawk comes ready-to-run, either with or without radio gear installed. This is great, because it shatters the popular myth that gas cars are troublesome to construct and to maintain. All you have to do with the Nitro Hawk is **fuel 'er up and ignite the glow plug!**

by FRANK MASI

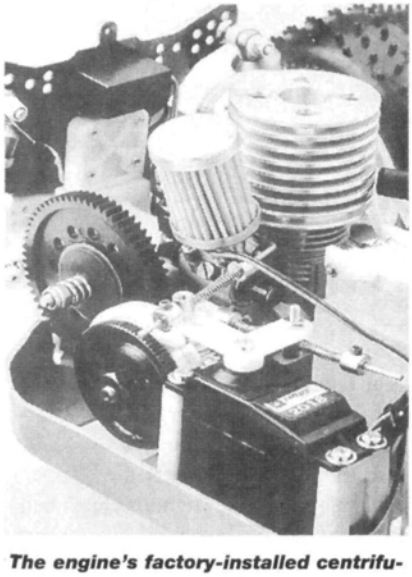
GAS FROM THE GET-GO

Although it shares its suspension and some driveline components with Traxxas' Blue Eagle LS racing truck, the Nitro Hawk has a brand-new aluminum tub chassis and a host of other new goodies that drive home one very important point: this isn't a bolt-on rework of an existing truck; this is a serious machine that was designed from the word "go" to be nitro-powered.

GONE IS THE GRAPHITE

The aluminum chassis—a first for Traxxas—is stamped into a tub design, and its sidewalls provide the rigidity necessary for proper suspension operation. Aluminum is a very good chassis material (especially for gas-powered cars), and it provides a light, strong platform for the truck. The biggest benefit of an aluminum chassis is that it serves as a big heat sink and keeps the engine cool. In addition, I'm sure that a graphite chassis would have raised the price of the kit significantly—probably beyond the reach of many potential customers.

A stamped-aluminum front-suspension brace that's affixed to the tub chassis provides vital support to the front A-arm mounts, and keeps the front kick-up angle at a constant 30 degrees—even after harsh collisions! The rear of the tub houses the four double-A batteries that power the radio system. A molded-nylon T-piece snaps into place over the housing to secure the batteries.

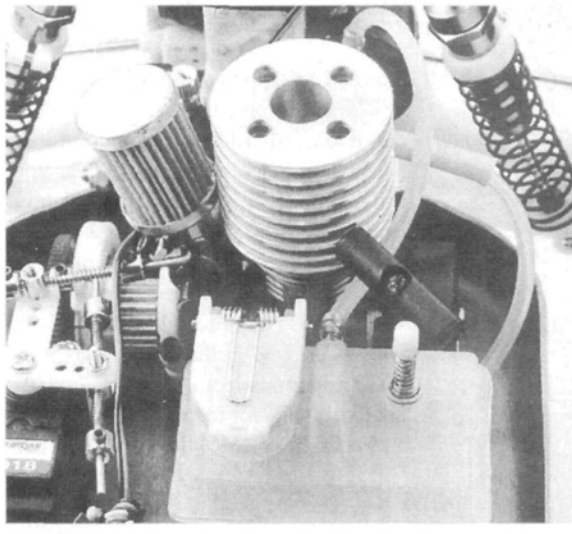


The engine's factory-installed centrifugal clutch is mated to the transmission's spur gear. To help minimalize wheel spin, a Traxxas slipper clutch is included with the Nitro Hawk.

SUSPENSEFUL ACTION

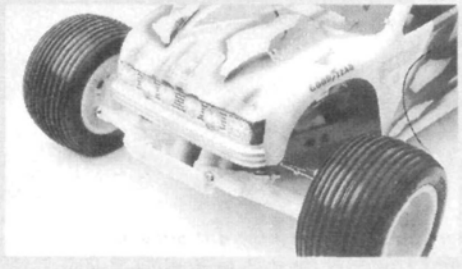
Make no mistake, the Nitro Hawk isn't a backyard novelty. Many of its suspension components were used on the Traxxas Blue Eagle race truck (the top-qualifying truck in the Modified Class at the '92 ROAR Truck Nats).

Extra-long front and rear A-arms are attached to the inner mounts and to the caster blocks (up front) and hub carriers (in the rear) with a new style of hinge pin. Instead of the traditional, grooved hinge pin that's retained at both ends by E-clips, the Nitro Hawk's pins resemble long Phillips-head screws, threaded only near the screw's head; with them, you can't accidentally over-tighten the



The Image 12 engine is easily fired by its built-in pull-start. The standard, large, finned-aluminum cylinder head keeps the engine running cool.

TRAXXAS NITRO HAWK



Scale 1/10
Price ..... $595 (with radio); $495 (without radio)

DIMENSIONS:
Overall length ..... 16 inches
Width ..... 12.125 inches
Wheelbase ..... 10.69 inches
Front track ..... 9.5 inches
Rear track ..... 10.125 inches

WEIGHT:
Gross (with battery) ..... 4 pounds, 0.75 ounce

CHASSIS:
Type ..... Tub with front brace
Material ..... Stamped aluminum

DRIVE TRAIN:
Type ..... Gear
Primary ..... Clutch bell/pinion gear/spur gear
Transmission ..... 3-gear (output ratio of 2.72)
Differential(s) ..... Planetary gear
Bearings/Bushings ..... Two bearings in tranny, Oilite bushings throughout

SUSPENSION:
Front/rear: Type ..... Lower A-arm, upper camber link
Damping ..... Oil-filled, coil-over shocks

WHEELS:
Front/rear: Type ..... One-piece "dish"
Dimensions (DxW) ..... 2.2x1.94 inches

TIRES:
Front ..... Pro Trax 4780 ribbed
Rear ..... Pro Trax 4790 6-row spike

POWERPLANT:
Engine ..... Traxxas Image 12
Carb ..... Rotating valve

OPTIONS:
Custom paint by Motion Graphics*; Horizon* Blue Thunder fuel (15%); Hobbico* glow igniter.

HITS
- It's ready to run so you can hit the track right away—just add fuel and go!
- National Champion Blue Eagle LS suspension
- The most comprehensive engine tuning and maintenance manual of any kit

MISSES
- Lacks ball bearings throughout transmission
- Rear bulkhead needs "beefing up"

pins and bind up the suspension.

The kit's four, tried-and-true, blue-anodized, oil-filled shocks should be adequate for any bumps or obstacles the Nitro Hawk may encounter. Long shocks are used up front, and a pair of Traxxas' X-tra long dampers are used in the rear. These aluminum-body shocks are rugged and should last a while, but dyed-in-the-wool racers may want to upgrade to Traxxas' hard-anodized units for increased durability.

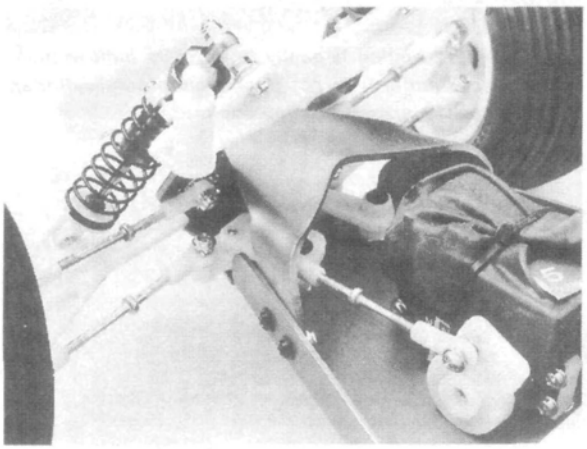
The fiberglass shock towers are attached in the front to the A-arm mounts; in the rear, they're secured to a small, square, nylon bulkhead that's slotted into a groove in the transmission-case halves. It wiggles a little in the groove, but it's nothing to worry about. I'd like to see a beefier mount for the rear shock tower, though—maybe one that's screwed into the chassis so it's more rigid. Mind you, I've crashed my Nitro Hawk and the mount has held, but I'd like to see it attached more securely on a truck that's capable of speeds that exceed those of its electric counterparts.

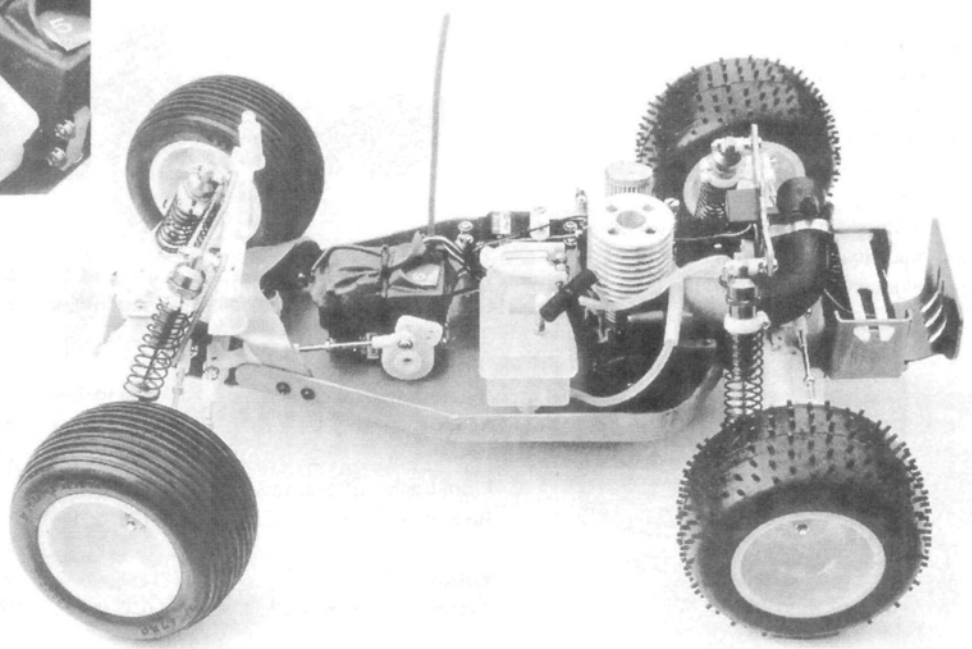
The rear shock tower pulls double duty as the rear body mount, and to the front shock tower is attached the nylon front body mount, which is designed to fit whatever shock-mounting location is chosen.

Experiment with viscosities of diff grease. Thicker grease gives the truck more steering under power, while thinner grease allows the truck to steer better at slower speeds. With thicker grease, the diff will be less likely to "unload." Unloading occurs when forward drive is momentarily lost as one of the two driven wheels lifts off the ground. A diff that's too free allows all of the engine's power to be sent to the wheel that's not in contact with the ground; the remaining wheel isn't driven until the other one comes back in contact with the ground.

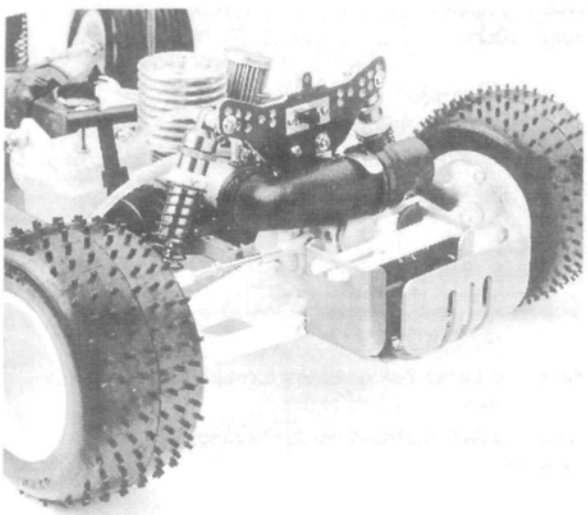
The task of absorbing driveline shock and limiting wheel spin falls to the Nitro Hawk's slipper clutch; it's similar in design to other Traxxas slippers—two pressure plates sandwich a spur gear. The holes in the center of the gear hold small, Rulon pegs. The pegs are what contact the pressure plates—the spur gear doesn't.

Ball bearings support the slipper-clutch shaft and the engine's clutch bell. Bronze bushings are used everywhere else in the tranny and at all four wheels. This keeps the kit's price low, and you can replace the bushings with ball bearings at any point.





Above: the race-winning front suspension (straight from Traxxas' Blue Eagle LS) is bolted neatly to the Nitro Hawk's aluminum tub chassis. A stamped-aluminum brace increases chassis rigidity. ■ Right: available in ready-to-run form (with or without radio), the Traxxas Nitro Hawk makes it incredibly easy to get your "nitro feet" wet. ■ Below: the rear suspension is all Blue Eagle LS. The aluminum chassis incorporates a battery-holding box for the four AA cells that power the radio gear. A quick-release "T" piece prevents the cells from falling out.



TRAXXAS TRANNY

The Nitro Hawk's new, 48-pitch, three-gear transmission design uses a rugged planetary differential. Why a planetary diff instead of a competition-type ball diff? Well, the Nitro Hawk is intended for R/C enthusiasts of all skill levels, and a ball diff might be too difficult for newcomers to build and to set (and to maintain). Ball diffs also cost more than gear diffs, and this would bump up the price of the kit yet again. A planetary diff with metal gears (like the Nitro Hawk's) should be just about bulletproof. (Again, die-hard racers can easily install a ball diff if they wish. The part number is 4620, and the retail price is $50.)

NITRO POWER!

Instead of relying on an outside party to supply its engines, Traxxas decided to come up with its own .12 engine. This potent powerplant is mounted just in front of the transmission, and has such

features as a handy pull-start, a rotating-valve carburetor and a large, aluminum, heat-sink cylinder head that keeps the engine cool.

A centrifugal clutch transfers the engine's power to the tranny. If you're unfamiliar with how this clutch functions, here's a brief description. Two semi-circular clutch shoes are attached to the engine's flywheel, but only one end of each shoe is fixed; the other end remains free. A spring placed around both clutch shoes keeps them together. A hollow, drum-like piece (the clutch bell), with a pinion gear on one of its ends, is slid over the clutch shoes, then attached to the engine's crankshaft. When the engine spins, centrifugal force makes both clutch shoes' unattached ends splay outward, where they contact the inside of the clutch bell, spinning it and the transmission's spur gear, to which the clutch bell's pinion gear is mated. The spring that's around the clutch shoes prevents them from opening too quickly and engaging the clutch bell too soon, which could stall the engine. Clutches are very important in gas cars; they allow them to idle at a standstill.

The Nitro Hawk has a nylon "band" brake that encircles the clutch bell. When the brakes are applied, the throttle/brake servo pulls the band until it rubs the clutch bell, stopping the bell's rotation and thus stopping the truck.

FIRE WHEN READY

After I had installed the radio system (I used a Traxxas two-channel system—a 2020 transmitter on 27MHz, two Traxxas 2018 servos, and a Traxxas 2019 AM receiver, wrapped in a balloon to protect it from any fuel spills), I was burning with excitement—I couldn't wait any longer to fire this thing up!

After just three pulls of the built-in starter, the little engine came to life with that unique gas engine burble and the pleasant (to us warped gas-heads) smell of nitro. It's critical that you follow proper engine break-in procedures. (Traxxas has included a very comprehensive engine tuning and troubleshooting manual, and this procedure is described in detail.) I know that your natural impulse is to make the Nitro Hawk scream on its very first run, but resist the temptation to set the carb lean; set it rich for at least four full tanks of fuel. The extra fuel provided by a rich carb setting will help to keep the engine cool as it wears in, and it will carry away any metal particles that are produced as the engine breaks in.

When the engine had been broken-in, I leaned the carb settings little by little, and the Nitro Hawk really began to get up and go! The track on which I tested the truck was fairly tight, but it had one long straight where I could bury the throttle and see what this little engine was capable of. Wow! As soon as the Nitro Hawk wound out, it was already down the straight, and I had to brake hard to avoid overshooting the next turn. I did come to the conclusion that the 20-tooth pinion gear/clutch bell that comes with the kit is a bit too big for most off-road tracks. I'd recommend switching to a 18-tooth unit (available from Traxxas, part number 3118) if you plan to do some off-roading.

Driving the Nitro Hawk isn't much different than driving an electric truck. The power comes on more slowly, but the top end is incredible. The trick is to keep the revs up, and you'll always have the power when it's needed.

If you follow proper break-in procedures, the engine should run for a long time before it needs a new piston and sleeve. Remember to use thread-locking compound on every metal-to-metal connection, because engine vibration can loosen nuts and screws.

Although I'd like to see a version of the Nitro Hawk with full bearings and a ball diff (maybe the trick shocks as well!), the kit I tested was no slouch on the track. Experts and newcomers will find it enjoyable to drive, even without the racing hop-ups, although I suspect that as the competition gets in on the action, more performance will become necessary.

It's nice to see Traxxas take the initiative and release a gas truck before any other American company. It's an excellent effort to boot—one that shows an exceptional attention to detail. The nice thing about gas is that it allows virtually unlimited run time—just pull 'er in and fill the tank. Now is the time to think nitro!

**Here are the addresses of the companies mentioned in this article:*
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***Motion Graphics,** 2645 Robert Arthur Rd., Westminster, MD 21157.*
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TWIN-TUBE LOWER BUMPER	$16.95	LIGHT MTG. BAR (HOLDS 4)	$ 4.95	ALUMINUM WHEEL DISCS (4)	$29.95
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ESP **WORLD RENOWNED LEADER OF PRECISION MACHINED CLOD PARTS SINCE 1988!!**

SCOPING OUT

(Continued from page 17)

servo, and you can even mount it with servo tape. In fact, if the mounting tabs get in the way, they're designed to be broken off easily.

Based on some fairly decent "on" resistance numbers, it appears that the SP-1840 should also work very well in a stock-class racing machine. It may not be destined to appear in a world-class high-speed oval race, but it should hold its own in a local road-race course. The SP-1840 has exceptionally smooth throttle response—the kind that would make it a snap to maneuver around a tight roadcourse.

The instruction sheet is virtually nonexistent, and the controller lacks a pulse-checking LED, but if you have installation problems, perhaps a knowledgeable friend or someone at a hobby shop can help. A little tinkering should produce a usable setting for this controller. So, all things considered, the SP-1840 may well be the price/performance king of its class.

**Here's the address of the company that's featured in this article:*
***Hitec;** distributed by RCD, 9419 Abraham Way, Santee, CA 92071.*

MOUNT TIRES

(Continued from page 85)

rotate the tire to ensure a uniform fit. If the tire starts to stick before you have it centered, just soak the wheel and tire again in the paint thinner.

If the tire and wheel are of different brands, you may not be able to fully center the tire because the wheel might be wider than the tire. In this case, always make the tire fit the wheel's innermost edge so that you have the option of trimming the wheel's outside edge flush with the tire. If you know that the tire will be used only on the right side of the car (superspeedway racers take note), mount it so that it's flush with the outside of the wheel to achieve a staggered wheel-track.

You now have a completely mounted tire. Using a clean rag and paint thinner,

(Continued on page 100)

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MOUNT TIRES

(Continued from page 99)

clean off any glue that may still be on the outside of the tire. Let the tire sit for at least 1 hour before you use it or put it on a tire truer. If your tires are wider than your wheels, use a truer to trim off the excess foam and make them narrower.

Since you're now mounting your own tires, you can do other things, e.g., dye your wheels to match the car before you mount your tires, or mount untrued tires and cut them to your own dimensions. Mounting your tires isn't that tricky; just make sure that you buy tires that are the correct size for your wheel. A narrow tire and a wide wheel make a terrible combination!

**Here are the addresses of the companies mentioned in this article:*
***Kimbrough Products,** 1420 East St. Andrews Pl., Unit F, Santa Ana, CA 92705.*
***AJ Products,** 441 Bahr Dr., Ben Lomond, CA 95005.* ■

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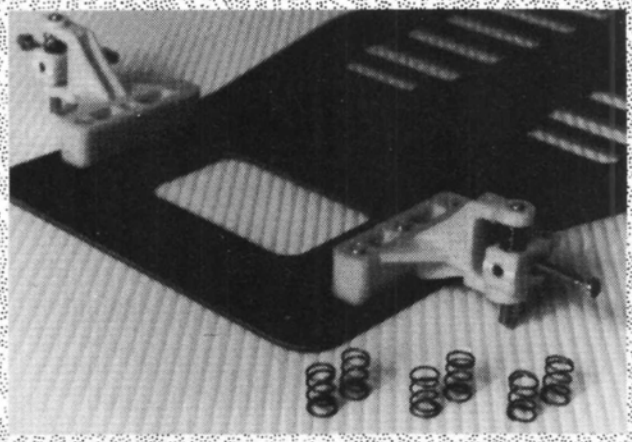

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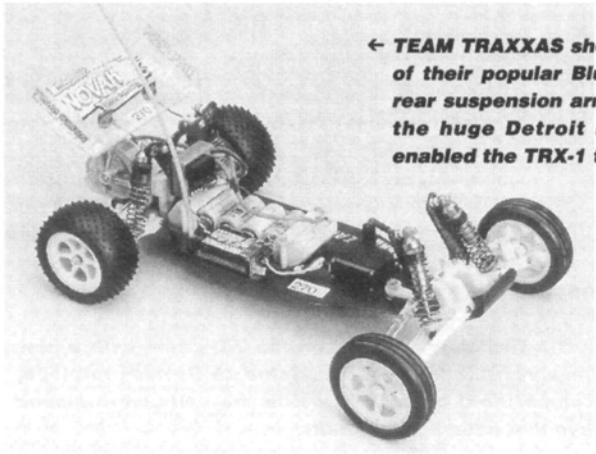
RACER NEWS

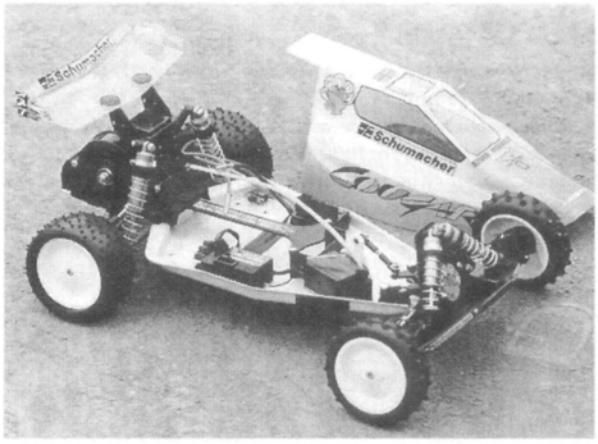
WORLD-CLASS RACING

What to Expect at the '93 Worlds

So, are you guys **getting psyched** for the **Worlds in England** this summer? We **definitely** are! Not only will it be the place where the **best drivers** put on a **spectacular** race, but it's also where all the **trick, new racing equipment** is **debuted**. That's when we'll see what cars we'll be racing—**we hope!**—a few months later. For those of you who aren't up to speed on what happened with the **major manufacturers** and their cars at the last **IFMAR Off-Road World Championship (Detroit, '91)**, let's take a quick look back.



← TEAM TRAXXAS showed up with the all-new TRX-1. A derivative of their popular Blue Eagle racing truck, it had long front and rear suspension arms and gobs of suspension travel to soak up the huge Detroit bumps. Long-stroke, hard-coated shocks enabled the TRX-1 to handle the infamous "surf's-up" section.



SCHUMACHER came with all-new suspension components for the Cougar—among them, new shock towers and extremely rigid, light plastic rims. Ball-bearing-supported, alloy slider shafts were designed to let the suspension operate with much less friction and provide stable handling. →

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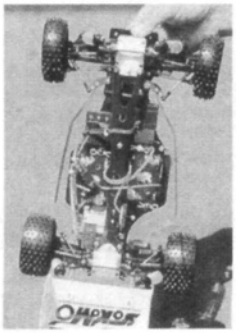
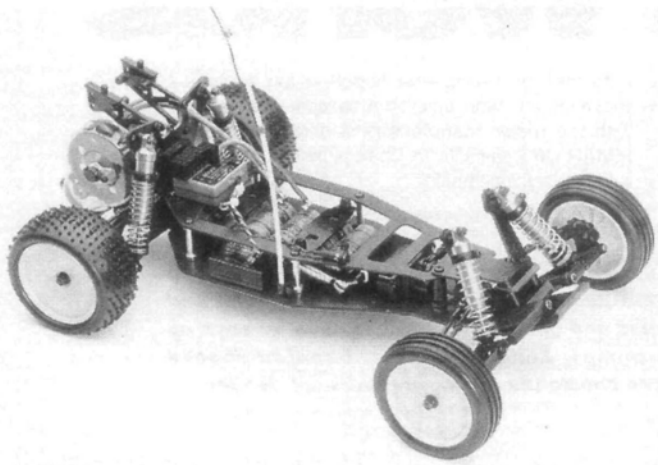
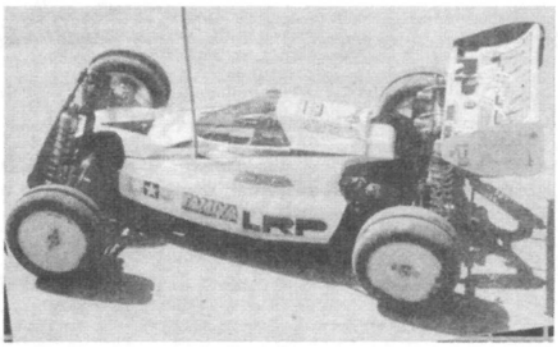
RACER NEWS



YOKOMO's racers were divided. Some used the American model of Yokomo's 4WD car (the YZ-10), and others used the Japanese Works '91 car. Most Team Yokomo cars (including Cliff Lett's winning car) were extensively modified. The front bulkheads were narrowed to accommodate longer suspension arms, and there were re-designed front and rear shock towers to which longer shocks were attached. A Stealth-like friction slipper clutch helped to control wheel spin.

. . . .

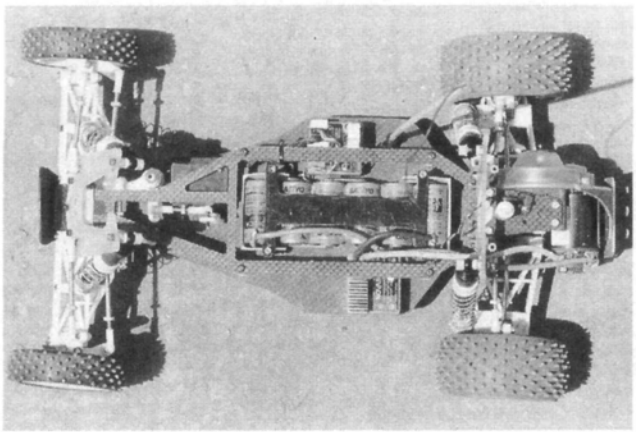




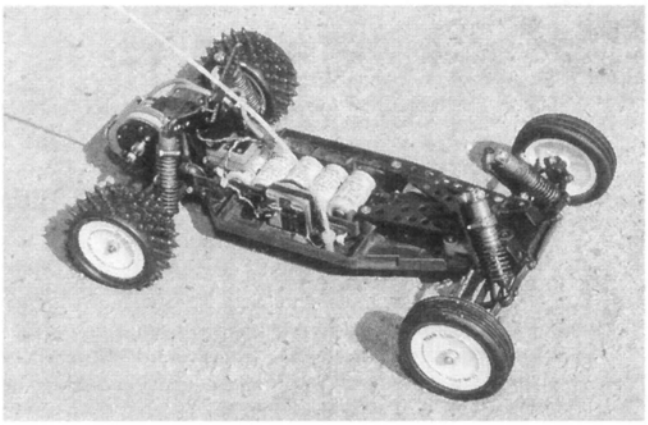
TAMIYA brought super-modified 4WD Manta Rays and 2WD Astutes. Some of them had graphite chassis, prototype trannies and slipper clutches. Production versions of the Tamiya Worlds cars were later released to the public as the Super Astute 2WD and the Top Force 4WD.

KYOSHO came to race with an all-new 2WD and an all-new 4WD—the Triumph and the Lazer ZX-R. Teflon-coated shocks made suspension action smooth on the Triumph, while the ZX-R (which was based on the ZX) came with a new body, a slipper clutch, longer front shocks, ball diffs and a one-way front-drive system. Some ZX-Rs had prototype, custom, 6-cell (the maximum number of cells for IFMAR competition) chassis in which the cells were placed toward the rear of the car. Others had experimental diff pulleys that used 3/32 diff balls.

. . . .



ASSOCIATED raced the ultra-fast Stealth car, which had been updated from its first appearance at the '89 Worlds in Australia. The front shock tower was mounted forward on the bulkhead, the shocks were mounted behind the tower, and the front kingpin's pivot axis was lowered in relation to the front arms. The dual-plane graphite chassis was the same as that used on the original '89 Stealth car, as were the extra-long rear A-arms. Unlike the '89 car, which had handmade gearboxes, the '91 versions used production Stealth trannies. The chassis had a graphite upper deck to make it more rigid.



TEAM LOSI unveiled the Double-X at the '91 Worlds. Built on a narrow version of the Junior Two's molded chassis, the "XX" had new, medium-length front shocks and handmade front arms. The arms are mounted on a hinged bulkhead that varied kick-up. The XX also had a new front-wheel design that placed the wheel bearings in the front hubs, not in the rims. Losi also unveiled its hydraulic slipper clutch unit—the Hydra Drive. Many of the Double-X's innovations are found on the current JRX-Pro SE.

But that was then, and this is now. What can we expect from them at this race?

ASSOCIATED has had two years to **refine** its **Stealth car.** No one outside the company has been able to catch a glimpse of the new ride. I have a feeling that the car **Associated will run in England** will look substantially different than its predecessor.

TAMIYA has all-new racing vehicles—the **Top Force Evolution 4WD** race car and the **2WD Dynastorm.** We've seen the early versions, and they're more **race-oriented** than anything **Tamiya** has ever made.

TEAM LOSI's Double-X car will resurface in England, and it should be a **top contender**. The new, **three-gear tranny** that has just been released will be part of it. **Losi insiders** aren't talking, but I'd **imagine** that the **new Double-X** will be new from the ground up.

TEAM TRAXXAS should release its updated version of the **TRX-1** (rumors say it will be called the **TRX-2**, but who knows?); it could have a shorter wheelbase, an all-**fiberglass double-decker** chassis and shorter front arms for quicker steering. Rick Vehlow has been testing the car and it ***should*** be ready this summer.

SCHUMACHER's prototype 2WD (featured in the March '92 "Racer News") will hit the tracks in its home country—that's the hot word on the street. It features a **double-decker fiberglass** chassis that's secured with molded cross braces. The car has extra-long front and **rear suspension arms**, and an **all-new gear-drive tranny** sits in the back. The new **tranny** replaces the **old belt-drive tranny.**

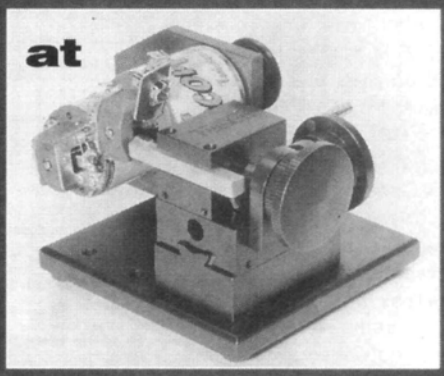
YOKOMO hasn't given us much to go on yet. We do know that they're going to merry olde England with **updated Works '93 cars.** You don't really think that **Masami** would show up with anything less than the best, do you? As we get more info, we'll pass it along.

As of now, that's all the news we have from the big guys. When our spies infiltrate further, we'll get the dirt straight to you. Stay tuned!

TEAM TRINITY DOMINATES WINTER BLAST

There were 384 entries at the 4th annual Cam K&N Winter Blast in Connecticut, and Team Trinity swept four of the top five spots with its all-new Superspeedway version of the Evolution 10. The popular indoor carpet oval was well-suited to Team Trinity's new car. TQ Joel Johnson led the way to the checkered flag, followed by East Coast Trinity drivers Shane Kocher in 3rd, Todd Putnam in 4th and Ken Tuttle in 5th. Joel was the only racer in the pack who had a 54-lap run that weekend.

TWISTER makes a CLEAN CUT at THUNDERDROME



Twister Motors took its new **Stock Mini Lathe,** which cuts a stock motor's armature while it's still in the can, to the **'92 Thunderdrome.** So what's so special about that? Well, **Twister** President **Mike Walker** and two **Twister** technicians spent the weekend offering tuning tips to racers and **re-truing** more than **200 handout stock motors—totally free.** This gave racers the opportunity to get **maximum performance** and **longer life** from their motors, and it **helped** to make the racing as **fair** as possible. **Major thanks to Mike Walker** for offering such services; we hope that other manufacturers will **learn from his example,** jump on the bandwagon and **help** the dedicated racers at **major events.**

CAR ACTION TALKS TO PROCAR

For some reason, because I'm the editor of a major magazine, everyone has the **impression** that I'm always in the know. Although that might be true, my journalistic nature always sends me on the investigative trail. You know: **"Get the facts."**

Well, recently the wire has been going crazy with inquiries about the **$25,000 World Series of Racing sanctioned by PROCAR (Professional Radio Operated Championship Auto Racing).** I knew ***Car Action*** was a **major player** in the series. I knew the series was **on-road oval.** I knew **John Thawley** was the **mastermind.** I knew that I'd better call him.

FM: What's going on? Tell me about PROCAR and the $25,000 World Series of Racing.

JT: Don't you read Chianelli's "Inside Scoop"?

FM: Yeah, but Chianelli is a skinny runt. He lives on little tidbits of life. I gotta have the meat of the matter.

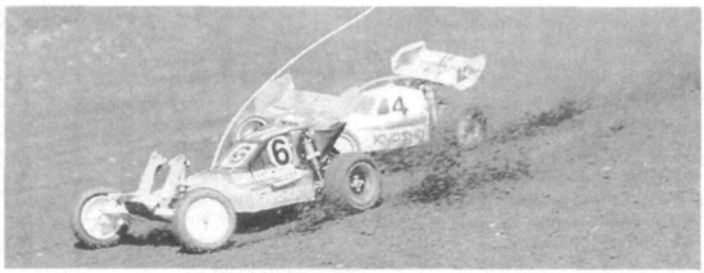
JT: Well, the first series PROCAR is running is for 1/10-scale on-road oval cars. It's sponsored by *R/C Car Action,* PSE, HPI, Bud's Racing, Robinson Racing, CAM Motors, Team Class, Trinity, Panasonic, Point Blank, Composite Craft, Magic Motorsports, Novak Electronics, TRC, Sanyo, DuraTrax and Speedworks. We're using NASCAR-type bodies and we're racing all over the country. So far, we have more than 60 qualifying races scheduled throughout the summer. Drivers can race in these qualifiers as often as they like. Their two best finishes will qualify them for any of the three National events held later in the season. Nationals will be at K&N Speedway in Connecticut, Ameri-Trac in Illinois and Lake Whippoorwill in Florida. Only their best National finish will get them invited to the World Championship, which will be held at PC Hobbies King Superspeedway in North Carolina in October.

FM: That sounds great. Now, somebody said something about needing a license. What's that about?

JT: All drivers will be required to buy a **PROCAR** license for the series. Drivers who race in the stock class will need a Sportsman Challenge license, and modified drivers will need the Formula America license. **PROCAR** has also developed a PRO license that's available directly from **PROCAR** and must be applied for by résumé. All other licenses can be purchased at your local track.

FM: What do you get with a license, and when do you get it?

JT: Drivers can purchase their licenses at the track. They will be $25. All licenses are numbered and come with a clear plastic holder. So each driver will receive, on the spot, a **PROCAR** license, a license holder, a rulebook and an official **PROCAR**



NORRCA 1993 Partial Schedule

Apr 3	**So. Cal. Off-Road Series #4, Outlaw R/C, Highland, CA**
Apr 18	**So. Cal. Dirt Oval Series #3, Fast Lane, Saugus, CA**
Apr 23-25	**1993 SCORE Show, Anaheim Convention Center, Anaheim, CA**
May 15	**So. Cal. Off-Road Series #5, Break-A-Way, Norco, CA**
May 16	***So. Cal. Dirt Oval Series #4, Metro Raceway, Bakersfield, CA***
May 21-23	**Dirt Oval Nationals (location not set)**
June 5	**So. Cal. Off-Road Series #6, Fast Lane, Saugus CA**
June 6	**So. Cal. Dirt Oval Series #5, Racers Haven Bakersfield, CA**
June 19-20	**California Paved Oval State Championships (location not set)**
June 25-27	**Off-Road Nationals (location not set)**
July 10	**So. Cal. Off-Road Series #7, Ranch Pit Shop, Pomona, CA**
July 18	**So. Cal. Dirt Oval Series #6, Ventura Road Runners, Camarillo, CA**
July 24	**Division 5 Paved Oval Championships (location not set)**
Aug 7	**Division 1 Paved Road Course Championships (location not set)**
Aug 14-15	**Division 1 Paved Oval Championships (location not set)**
Aug 21-22	**Kyosho Truck Championships (location not set)**
Aug 27-29	**Paved Oval Nationals (location not set)**
Sept 11	**Division 1 Dirt Oval Championships (location not set)**
Sept 19	**California Paved Road Course State Championships (location not set)**
Oct 2-3	**Paved Road Course Nationals (location not set)**
Oct 23	**California Dirt Oval State Championships (location not set)**
Nov 13-14	**Off-Road State Championships (location not set)**
Dec 4-5	**Division 1 Off-Road Championships (location not set)**

contingency sponsor decal template. In addition, **PROCAR** provides participants with $1,000,000 of liability insurance coverage.

FM: What the heck is a PROCAR contingency sponsor decal template?

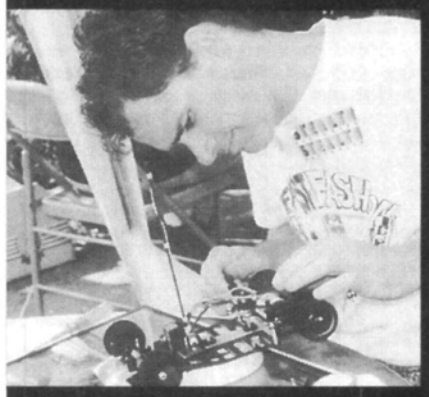
JT: It's just like what you see on the front fender of a **NASCAR** stock car in full-scale racing. **PROCAR** has 12 major sponsors that have put up the money to develop the series and the prizes. These sponsors get recognition through **PROCAR's** exposure at track and events. In **NASCAR,** drivers are required to run the contingency decals in order to receive "lap money." **PROCAR** drivers will run the contingency sponsor decals to be eligible for their qualifying points.

FM: That sounds awesome—just like the real thing. What about the prize money? How do you win?

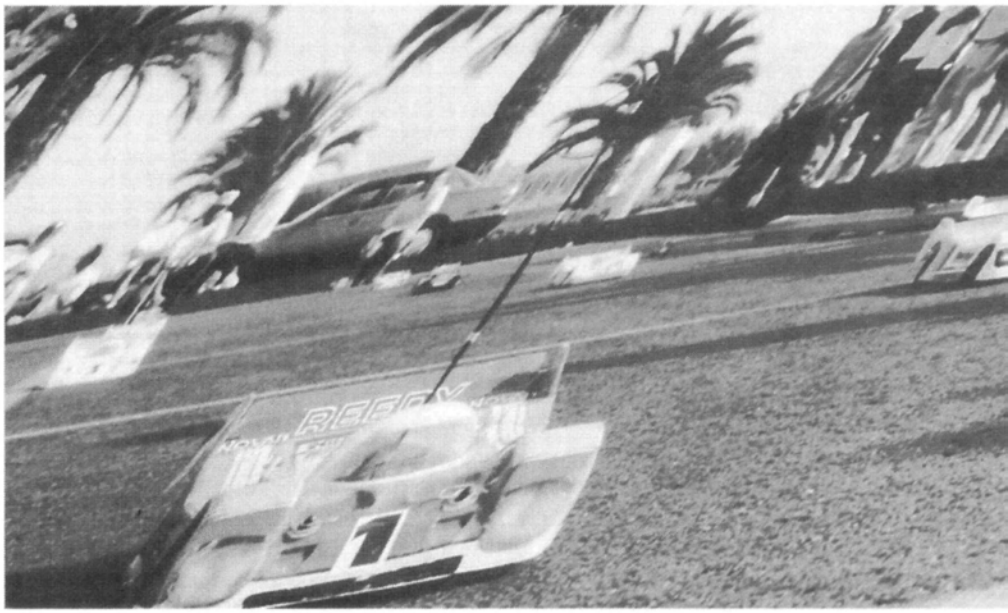
JT: Local races will be strictly for qualifying. Prize money is distributed only at Nationals and the World Championships. The **"Formula America"** license-holders and PRO-series drivers will compete for serious cash at these events. We'll be giving away about **$4,000** at each National event and more than **$12,000** at the Worlds. For the **"Sportsman Challenge"** drivers, we'll be putting together some huge gift-certificate packages from our sponsors. When I say huge, I mean a **$1,500** to **$2,500** gift certificate for the winner of the Sportsman Challenge World Championship.

FM: So PROCAR is running a World Championship for stock drivers too!

JT: Absolutely, Frank! We want everybody to come out and race and be part of the excitement. This is for everybody. PROCAR's main objective is to get drivers back to their local track racing! The series will be at tracks all over the country, starting with the PROCAR Speedweek, May 1 through May 7. We're running ads and schedules here in *Car Action,* so if drivers don't see their local track listed, they should bug the track owner to get involved! ■



SLICIN' IN SAN DIEG



PHOTOS BY MIKE LEE

1992 NORRCA ON-ROAD NATIONALS

by MIKE LEE

THE PLACE WAS San Diego, CA—an unlikely location for the prestigious 1992 NORRCA On-Road Nationals. More than 120 drivers from around the country converged at the U.S. Naval Training Center (NTC), a basic training facility. The Armed Services last participated in National-level modeling events 20 years ago. But, thanks to the efforts of Dan Crain of the base's Morale, Welfare and Recreation Division (MWR), the recreation center's front parking lot was transformed into a championship-level track. Not only was the track first class, but MWR also provided all the comforts of home: a short-order snack bar, a full-service restaurant, a well-stocked hobby shop, plenty of pit space and even a large bowling alley. The setting was perfect for a weekend of hot racing and total fun.

Friday was a full day of practice. Some of the base's civil engineers set up a huge generator that provided all the power anyone could use. The track was sprayed with a mixture of soft-drink syrup and water to beef-up the traction.

Left (top to bottom):
■ B. Ruff and Bobo are all smiles as they prepare their cars for the race. Both are members of the B. Ruff Racing Team. ■ Commander Grube presents a commendation award to Dan Crain for running the NTC race program. ■ The 1991 1/12 Expert Modified champion, Dave Berger, is prepping his car for a shot at another title. He only managed to reach 5th place. ■ Fernando Belair acknowledges the crowd during his introduction on the drivers' stand. Belair took the 1/10-scale Expert Stock class. ■ Tyree Phillips greets the camera while judging the Concours event.

Concourse winners, from left: D.J. Renwick, 2nd place; Tom Chartier, 3rd place; Mike Whenry, 1st place.

On Saturday, the racing started in earnest. A Navy Color Guard member presented Old Glory to the drivers, while another member sang the national anthem. NTC Commander Grube addressed the drivers and then presented a commendation award to Dan Crain for his effort to revive the racing program at NTC. After the ceremony, J.R. Sitman recited the laws of the racing land to the drivers.

Three rounds of qualifying were scheduled on Saturday and one last round on Sunday, which was followed by triple A-Mains in the Expert classes. In this type of final event, the top 10 qualifiers had to race three times; the winner was determined by the best overall finish in all three races. A tie would be broken by the total number of laps run. This method takes the luck out of winning, and it also provides a lot of racing bang for the buck.

"Noting that unsponsored drivers are at a disadvantage, NORRCA decided to have Sportsman classes."

NORRCA has drawn a line between sponsored and unsponsored drivers. Noting that unsponsored drivers are at a disadvantage, NORRCA decided to have Sportsman classes. Sportsman class drivers can't have full-time sponsors, and in the Modified classes, they're limited to using 1400mAh batteries; no 1700mAh batteries are allowed. Stock-class Sportsman drivers receive hand-out motors, and Expert-class stock drivers may choose any stock-class motor.

Only a few drivers really wowed the crowd in qualifying events. Tony Neisinger, 1/12-scale World Champion, demonstrated what being a world champ was all about. He fielded two cars, one in Expert 1/10-scale Modified and the other in Expert 1/12-scale Modified. In the first round, he topped both classes—only to have his 1/10-scale car disqualified in the second round.

But in the second round, all the drivers turned up the heat, only to be crushed by Neisinger. The same thing happened in the third and fourth rounds. Neisinger would not be denied.

Jeff Goodier held back the field in 1/10-scale Sportsman Modified, TQ'ed and won all four qualifiers.

Mike Skube smoked 'em in the 1/12-scale Expert Stock class. He kept his car one step ahead of the field and ended up with the TQ. Fernando Belair did the same in 1/10-scale Expert Stock class, but didn't quite win all the rounds. He still had the TQ position coming into the Mains. A seesaw battle for the pole went on to the Sportsman Stock class, and Scott Burns put together a glory run in the third round that was good enough for the pole.

On Sunday morning, before the final qualifier began, more traction compound was sprayed on the track. Unfortunately, some drivers ran a practice round just after the track was sprayed, and this lured them into a false sense of security. The cars stuck like crazy during practice, but slid across the track during the real thing.

winners

1/12-SCALE EXPERT STOCK

Fin	Qual	Name	Chassis	Moto
1	1	Mike Skube	Agitator	Extre
2	2	Eric Vasutin	12LW/RaceCo	Ironn
3	3	Richard McClasky	Associated 12LW	Revte
4	6	Paul Tomin	Associated 12LW	n/a
5	5	Jim Hoff	Associated 12LW	Extre
6	4	Bob Zangmeister	Associated 12LW	Reed
7	9	Jerry Peralto	GTP Nissan 12	Extre
8	7	Brian Weeks	Agitator	Extre
9	10	Marty Salgado	Associated 12L	Extre
10	8	John Salgado	Associated 12L	Revte

1/10-SCALE EXPERT STOCK

Fin	Qual	Name	Chassis	Moto
1	1	Fernando Belair	Associated 10L	n/a
2	2	Mike Skube	Cheetah	Extre
3	3	Jim Walls	Associated 10L	Califo
4	4	Paul Smith	Associated 10L	Twist
5	10	Ryan Crabb	Associated 10L	Extre
6	9	Rich Douglas	Associated 10L	Faste
7	6	Nil Lew	Ultimate 10	Ultim
8	7	Ken Prue	Associated 10L	Extre
9	5	Roy Powell	Associated 10L	Extre
10	8	Dan Crain	Associated 10L	Extre

1/12-SCALE EXPERT MODIFIED

Fin	Qual	Name	Chassis	Moto
1	1	Tony Neisinger	Associated 12LW	Extre
2	2	Barry Baker	Associated 12LW	Reedy
3	3	Jim Walls	Associated 12LW	Califo
4	5	Jason Ertrachter	DA Graphite 12LW	Extre
5	4	David Berger	DA Graphite 12LW	Twist
6	7	Mace Horowitz	Bolink	Revte
7	6	Mike Garrett	Bolink	Revte
8	10	Tom Prokop	Associated 12LW	Extre
9	8	Brad Bradbury	Agitator	Extre
10	9	Ken Prue	Associated 12LW	Extre

1/10-SCALE EXPERT MODIFIED

Fin	Qual	Name	Chassis	Moto
1	1	Tony Neisinger	Associated 10L	Extre
2	5	Barry Baker	Associated 10L	Reedy
3	6	Frank Killam	Associated 10L	Reedy
4	3	Ron Schuur	Associated 10L-T	CAM
5	2	Tyree Phillips	Associated 10L-Ty	Trinit
6	4	Mike Garrett	Bolink	Revte
7	7	Mace Horowitz	Bolink	Revte
8	9	Jay Kimbrough	Bolink	Big Ji
9	8	Jason Ertrachter	DA Graphite 10L	Extre
10	10	David Gestoso	HPI	HPI

1/10-SCALE SPORTSMAN STOCK

Fin	Qual	Name	Chassis	Moto
1	1	Scott Burns	CKW Oval	
2	4	Alex Schuck	Composite Craft 10L	H
3	2	Mike Critelli	Bolink	A
4	3	Joseph Hawkins II	Composite Craft 10L	N
5	5	Thomas Watana	n/a	D
6	8	Scott Yow	Associated 10L	O
7	6	Chris Dodson	n/a	U
8	7	Rick Meredith	Associated 10L	T
9	9	Shaun Salvino	Associated 10L	
10	10	Greg Larson	Associated 10L	

1/10-SCALE SPORTSMAN MODIFIED

Fin	Qual	Name	Chassis	Moto
1	1	Jeff Goodier	Associated 10L	Extre
2	2	Mike Lee	Associated 10L	Reedy
3	4	Chuck Mann	Bolink California Flyer	Big E
4	6	John Lenhardt	Bolink California Flyer	Reedy
5	5	Jim Collis	Lynx II	Extre
6	3	Richard McClosky	Associated 10L	Revte
7	7	Ron Ponce	CKW Narrow	Cobra

ESC	Radio	Batteries	Charger	Body	Tires	Sponsors
Tekin	JR	n/a	Novak/Victor	n/a	Associated	CKW, Advanced Racing, Extreme Motorsports, CKW Tires, B-Sly Racing, Team Kamakaze
Tekin	Airtronics	n/a	n/a	Fast Fashion	Arrows	Ironman, S&K Racing, Tecnacraft, Fast Fashion, RaceCo, J&M Hobbies
Corally	Futaba	Sanyo	Tekin	Fast Fashion	Arrows	J&M Hobbies
Novak	n/a	n/a	n/a	n/a	n/a	
Novak	Futaba	MaxCell	Victor	Bolink	TRC	
Tekin	Futaba	Stealth	Tekin	Associated	Ufra	
Tekin	JR	n/a	Tekin	n/a	Paragon	
Novak	Futaba	Perfect Match	Victor	Associated	Associated	
Tekin	Futaba	Quantum	Tekin	Lotec	CKW	
Tekin	Futaba	Sanyo	Tekin	Chevy	Paragon	

Mike Skube has a solemn look as he ponders the triple A-Mains. Skube took 1st in 1/12 Expert Stock and 2nd in 1/10 Expert Stock.

ESC	Radio	Batteries	Charger	Body	Tires	Sponsors
Novak	Airtronics	MaxCell	Novak	Andy's	TRC	Associated, MaxCell, TRC, Novak, Andy's, Kimbrough, HPI
Novak	JR	n/a	Novak/Victor	Andy's	CKW	Cheetah, Extreme Motorsports, CKW Tires, B-Sly Racing, Team Kamakaze
Futaba	Futaba	What	Mighty Mite	Fast Fashion	Associated	California Motor Works, Fast Fashion
Novak	KO Propo	MaxCell	Victor	Andy's	TRC	Twister, Fast Fashion, Andy's
Novak	Futaba	Ballistic	Novak	HPI	Gomme	Extreme Motorsports, Ballistic Batteries
Novak	Futaba	Team Smooth	Novak	Andy's	PSE	
Novak	Futaba	Ultimate	Tekin	Associated	TRC	Ultimate Racing, The Finest R/C, Trinity
Tekin	Futaba	Stealth	Victor	HPI	Associated	Extreme Motorsports, Team Kamakaze
Novak	Airtronics	Extreme	Novak	Associated	HPI	Extreme Motorsports, HPI, Tecnacraft
Novak	Airtronics	Stealth	Comp. Elec.	Andy's	TRC	US Navy

Tony Neisinger is caught in the act of preparing his car.

ESC	Radio	Batteries	Charger	Body	Tires	Sponsors
Tekin	Airtronics	Salvino	Tekin	Associated	TRC	Tekin, Extreme Motorsports
Novak	KO Propo	MaxCell	Novak	Fast Fashion	TRC	Associated, Reedy, Novak, KO Propo, MaxCell, Tecnacraft, Du-Mor, TRC, Bud's
Futaba	Futaba	What	Mighty Mite	Fast Fashion	Associated	California Motor Works, Fast Fashion Bodies
Novak	Airtronics	MaxCell	Tekin	Fast Fashion	PSE	Fast Fashion, Andy's, Davis Motor Sports, Extreme, DA Graphite, MaxCell
n/a	n/a	Stealth	n/a	Fast Fashion	Twinn-K	Twister, Stealth Batteries, Twinn-K, Davis Motor Sports, Fast Fashion
Novak	Airtronics	Panasonic	Comp. Elec.	Bolink	Kimbrough	Bolink, Kimbrough, Revtech, Tecnacraft, Big Jim Racing
Tekin	Futaba	Stealth	Tekin	Bolink	Kimbrough	Bolink, Revtech, Kimbrough, Stealth, Tekin, Big Jim Racing, Cheetah
Novak	Futaba	Quarterflash	Novak	Andy's	HPI	Prokop Racing
Novak	KO Propo	Panasonic	Comp. Elec.	Andy's	Paragon	Advanced, Extreme Motorsports
Tekin	Futaba	Stealth	Victor	Associated	Twinn-K	Extreme Motorsports, Team Kamakaze, Dan's Building Service

ESC	Radio	Batteries	Charger	Body	Tires	Sponsors
Tekin	Airtronics	Salvino	Tekin	Associated	TRC	Tekin, Extreme Motorsports
Novak	KO Propo	MaxCell	Novak	Associated	TRC	Associated, Reedy, Novak, KO Propo, MaxCell, Tecnacraft, Du-Mor, TRC, Bud's
Tekin	Airtronics	Team Smooth	Tekin	PSE	PSE	Associated, Reedy, Airtronics, PSE, Team Smooth, Kimbrough, Tecnacraft, Autographics
Novak	KO Propo	CAM/Arlington	Novak	Andy's	TRC	CAM, TRC, Novak, Associated, Arlington, Tecnacraft, Andy's, Kimbrough, Bud's
Novak	KO Propo	Trinity	Novak	Andy's	TRC	Novak, Trinity, TRC, Composite Craft, Kimbrough, T&T Front End
Tekin	Futaba	Stealth	Tekin	Bolink	Kimbrough	Bolink, Revtech, Kimbrough, Stealth, Tekin, Big Jim Racing, Cheetah
Novak	Airtronics	Panasonic	Comp. Elec.	Bolink	Kimbrough	Bolink, Revtech, Kimbrough, Tecnacraft, Big Jim Racing
Novak	Futaba	Ballistic	Novak	Bolink	Bolink	Bolink, Big Jim Racing, Futaba, Novak, Ballistic, Kimbrough
Novak	Futaba	MaxCell	Tekin	Andy's	PSE	Fast Fashion, Andy's, Extreme, Barry Baker, DA Graphite, MaxCell, Davis Motor Sports
Novak	Airtronics	Ballistic	Comp. Elec.	HPI	HPI	HPI, Ballistic, Kimbrough

ESC	Radio	Batteries	Charger	Body	Tires	Sponsors
Novak	Airtronics	Parma	Class	PSE	PSE	CKW, J&R, PSE, Parma
Tekin	KO Propo	Trinity	Victor	Associated	PSE	Twister
Novak	KO Propo	n/a	Tekin	Andy's	TRC	Andy's
Tekin	Futaba	Ultimate	Tekin	Associated	TRC	Team COMP
n/a	n/a	n/a	n/a	n/a	n/a	
Novak	Futaba	Trinity	Tekin	Associated	TRC	
n/a	n/a	n/a	n/a	n/a	n/a	
Novak	Airtronics	Team Smooth	Novak	Associated	PSE	Faster Racing
Novak	Futaba	Quarterflash	Tekin	Andy's	Twinn-K	Salvino, Inc.
Novak	Futaba	Stealth	Novak	Andy's	PSE	

The winning drivers ham it up for the camera.

ESC	Radio	Batteries	Charger	Body	Tires	Sponsors
Novak	Futaba	Stealth	Tekin	Andy's	HPI	
Novak	Airtronics	Reedy	Victor	Andy's	Associated	Associated, Reedy, Team Kamakaze, Brigitte Unlimited
Tekin	Futaba	Stage III	Victor	Andy's	CKW	
Novak	Futaba	Stealth	Victor	Dahm's	CKW	
Novak MXc	Futaba	Sanyo	Tekin	Pro-Line	Associated	Allen Racing
Corally	Futaba	Sanyo	Tekin	n/a	Arrows	J&M Hobbies
Tekin	Futaba	Stealth	Victor	Associated	CKW	

Remember: never run just after the goop goes down. Let the other poor fella do it for you!

The Concours event started things off. Mike Whenry's gorgeous Jaguar GTP took top honors, hands down. The car's detailing was topnotch. Second place went to T-shirt artist D.J. Renwick and his 1/12-scale Fast Fashion Nissan GTP. Tom Chartier's flaming 1/10-scale Porsche 962 was 3rd.

In the Mains, the racing was hot and heavy. The three A-Mains were broken up enough to allow the cars to be serviced between runs. During these times, the Sportsman Mains were run, and this made the action nonstop. Pole-sitter Scott Burns, who had moaned about his car earlier in the weekend, (he mumbled something about the car being a "pile of stuff") ran away with this one. I guess you *can* scare a car into running hard!

In the 1/10-scale Sportsman Modified class, TQ'er Jeff Goodier was running as if on a Sunday stroll, while a faltering Mike Lee just couldn't clear the traffic to make a shot at the lead.

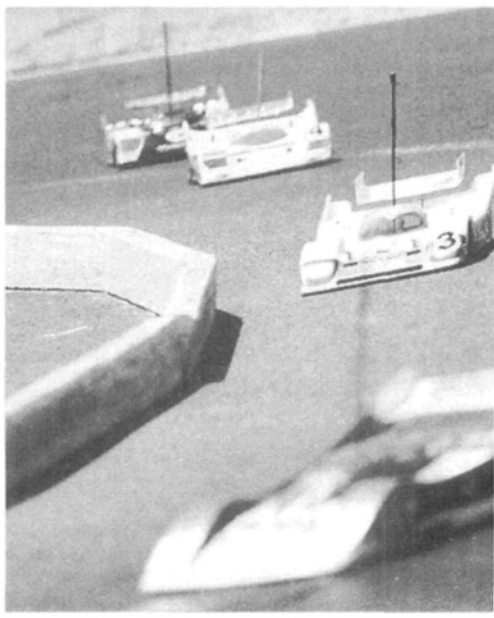
Meanwhile, in the A-Mains, Neisinger defined the word "dominate." In both 1/10-scale Expert Modified and 1/12-scale Expert Modified, Neisinger maintained a death grip. He easily took all three races in both classes to become the undisputed national champ.

There was a hard-fought battle for 2nd in the 1/12-scale Modified class. Barry Baker took 2nd in the first round and Jim Walls captured 3rd. In the second round, Jason Ertrachter put in a serious bid for the top spot: he came in ahead of Baker and Walls, and only one lap down to Neisinger. Ertrachter couldn't keep up the pace in the third round. Baker rallied and stomped on Walls and Ertrachter to take the 2nd place overall.

As for the 1/10-scale Expert Modified class, good guy Frank Killam had a great boost toward his 2nd-place overall title when he finished 7 seconds behind Neisinger in the first round. Only Neisinger and Killam were on the same lap; Mike Garrett and Ron Schurr brought up 3rd and 4th. In round two, Barry Baker picked up the pace, and had a terrific fight with Killam that resulted in a 2nd place finish for Baker, and Killam took 3rd. Killam was sitting pretty until the third round, when he just couldn't put the formula together, allowing Baker, Schurr, Tyree Phillips and Mace Horowitz to slip by. Baker and Schurr battled it out, and Baker held on. Third place overall went to Killam.

The best A-Main event was the 1/12-scale Expert Stock class. Coming off the pole in round one, Mike Skube choked big time and allowed Eric Vasutin and Roger McClakey to blow by. Vasutin handled his car well and it had lots of speed, but in 1/12 scale, speed is a killer. Vasutin drained the battery; this allowed McClaskey to zip by in the last turn and take the first win.

In round two, Skube turned it up a notch after a talk with his pitman, Eric Soderquist.



Being beaten about the head and shoulders by his pit crew must have helped; Skube chased Vasutin around the track for the entire 8 minutes. Vasutin still had speed, but Skube had the corners. Vasutin caught the checkered flag only 2 seconds ahead of Skube, and McClaskey held on for 3rd, a lap down.

Round three: do or die. Skube took the lead from the start, followed by McClaskey and Vasutin. On lap three, Vasutin came close to a barrier and picked up a body pin in the front left wheel, which jammed it. By the time a track marshal could catch the car and remove the pin, Skube and McClaskey were long gone and almost lapping Vasutin.

Then came Paul Tomin. Tomin went head-to-head with Vasutin, holding off the car until Tomin dumped with only 45 seconds to go. Vasutin got by, but it was too late to catch the leaders. Vasutin dumped and managed 3rd. Skube disposed of McClaskey by 5 seconds for the win.

next action
race truck SPECIAL

Race Truck Suspension Tuning & Tire Selection
Home-Built Dragsters
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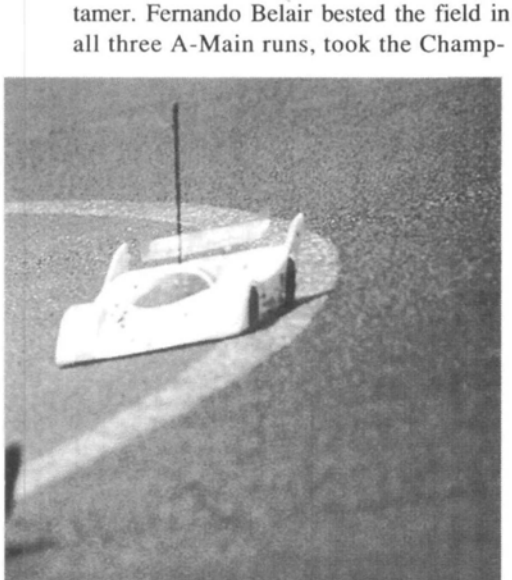
Schumacher Cougar Team Car
Kyosho Jordan Yamaha
Cheetah Telesis
Racer News
Reedy Race of Champions
Cleveland Indoor Champs
Speedworks Grand Finale

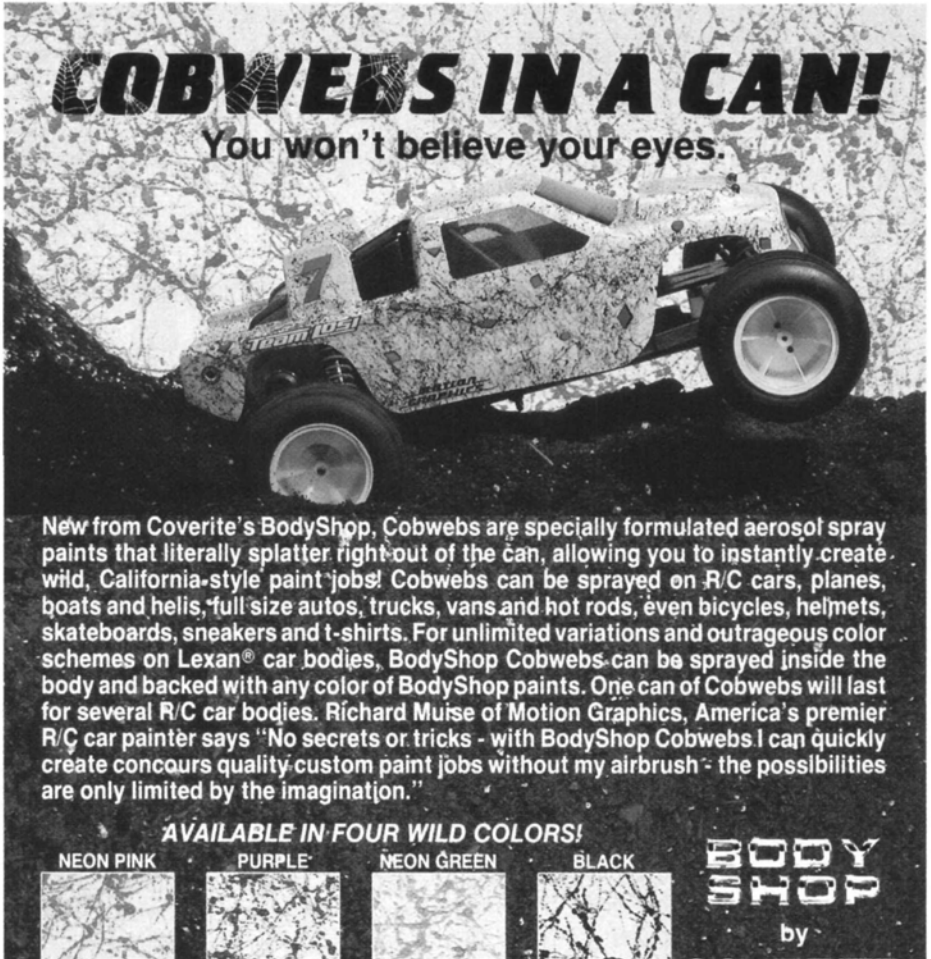
There was a three-way tie for the title, so it came down to total laps. In round one, all three drivers drove 25 laps. In round two, only Vasutin and Skube hit 25 laps; McClaskey had 24. In the third round, Skube had 25 laps and Vasutin had only 24. Skube took the title by one lap! Although he had the same number of laps as McClaskey, Vasutin's fast times earned him 2nd. Talk about taking it to the wire!

The 1/10-scale Expert Stock class was tamer. Fernando Belair bested the field in all three A-Main runs, took the Champ-



ionship title by round two, and shoved it down their throats in round three. It wasn't pretty, but the rest of this class really had to fight for positions during all three rounds.

The awards ceremony was a time for celebration for all—for the drivers who took part in this event and for the hard-working troops at the NTC. Less than a year ago, it was a dream to have a Nationals event where there was no permanent track. But the efforts of a few dedicated people made the dream come true. As Commander Grube said in his address to the drivers, "I see this as a family event. There are families here, racing together as a unit. This is what we're here for—to make the family unit work in America." Got it right on the button, Commander. Our thanks to the Navy family for a great event and to NORRCA for putting it all together. ■



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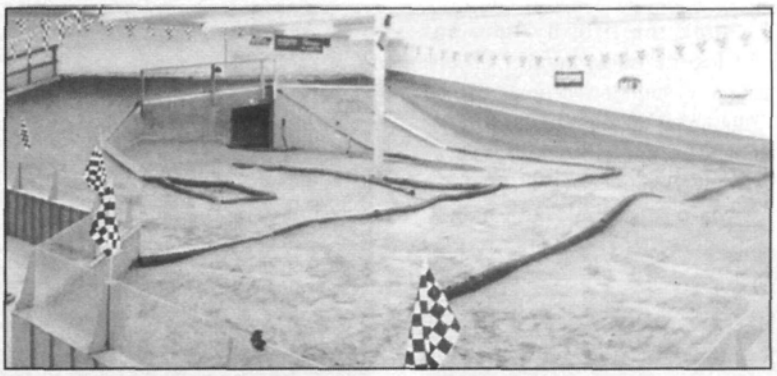
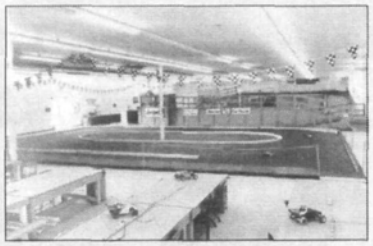
RACER NEWS

HOT TRACKS



MEGADROME RACEWAY, NORTH ADAMS, MA

IF YOU'RE LOOKING for a track that's run by racers for racers, check out the Megadrome Raceway in North Adams, MA—about an hour from both Albany, NY, and Springfield, MA. Owned and operated by the Berkshire Radio-Controlled Car Racers club, this 17,000-square-foot indoor facility houses two tracks: a large, multi-level, off-road dirt track and a flat carpet oval that can double as a carpet roadcourse.



The club opened the facility about a year and half ago with a tiny carpet track in one corner of the huge building. The large carpet oval was built next, and work began on the dirt track six months later. Recently, the club added to the dirt track, making it one of the most unusual off-road tracks in the country. It has a 420-foot center line, and approximately one-third of it is elevated by 8 feet. Four huge ramps lead to and from the elevated sections. To keep things interesting, the track's direction and layout are changed regularly.

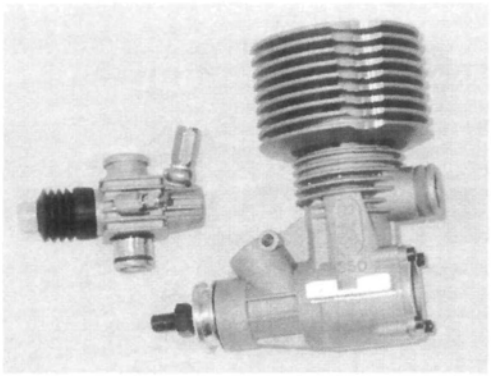
The 60x50-foot carpet oval features a pit row for enduro racing. The club has several 1/12-scale roadcourse track designs that can be changed quickly so that oval and roadcourse races can be run on the same night.

Both tracks are close to the large drivers' stand, which has two wheelchair-accessible ramps, and the large pit area, which has enough tables with electricity to accommodate 150 racers. The facility also features a well-stocked concession stand and large rest rooms. On race days, two area hobby shops sell parts and supplies, and rental vehicles are available. Race management is handled by Trackmate computer software and an AMB 20 lap-counting system.

The track is open for practice on Wednesday nights and Saturday afternoons. Races are held on Saturday nights and Sunday afternoons. The address is Megadrome Raceway, Store #1, North Adams Plaza, Rt. 8, Curran Hwy., North Adams, MA 01247, or call (413) 663-9593. ■

RACER NEWS

SPEED SHOP



OFNA RACING
Brat, .21 Six-Port Rear-Exhaust Engine

The six-port, high-output, 2hp, 30,000rpm Brat .21 is modeled on the Nova Rossi; it comes with a tall, blue-anodized cylinder head. This engine is excellent for beginners who want power without a high price.

Part no. BRAT-21RSCP

Price: $150

OFNA Racing, 18 Technology, Ste. 159, Irvine, CA 92718.

. . .

PRO-LINE
PRO-83 Low-Profile Fuzzie Tire

Pro-Line's new, low-profile Fuzzie off-road tire provides extra stability because it has a lower sidewall. On harder surfaces, this ultra mini-pin tire offers improved traction. It fits any 2.150-inch or 2.2-inch 2WD or 4WD rear wheel. Available in the original XT compound only, it was the '92 NORRCA and ROAR 4WD national champion and '92 European champion.

Part no. 7083

Price: $11.95/pr

Pro-Line USA, 201 W. Lincoln St., Banning, CA 92220; (909) 849-9781.

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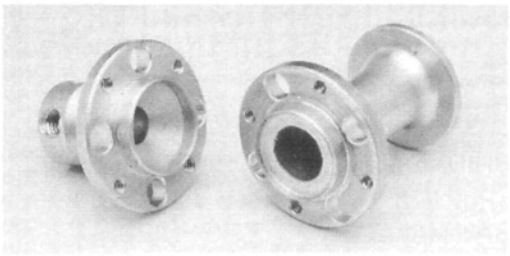

VANTAGE ENGINEERING
Stronglite Magnesium AZ31B-F 10LSS Hubs

Weight is an enemy of high-performance super-speedway cars, especially if it's a large part of the car's rotating mass. These hubs reduce the rotating mass of your rear-axle assembly and maintain the strength you've come to expect from your stock hubs. Vantage uses AZ31B-F—the highest grade of magnesium available. The hubs are available in pairs or separately (setscrew or clamp-type).

Vantage Engineering, 681 Main St., Waltham, MA 02154; (617) 894-8694.

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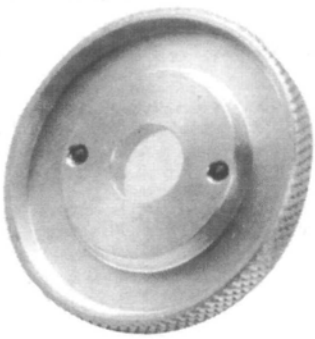


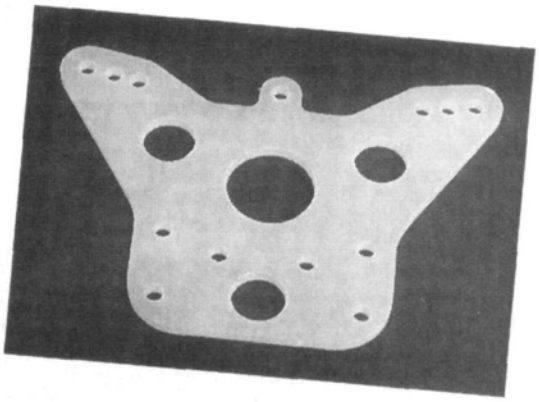
TRAXXAS
Lightweight Aluminum Flywheel

This new machined-aluminum flywheel for the Traxxas Nitro Hawk weighs only 10 grams—one-third the weight of the stock steel flywheel. This significantly reduces the rotating mass of the engine, so it allows quicker throttle response and faster acceleration. Simple, bolt-on installation. Made in the USA.

Part no. 3143

Price: $15

RPM
Rear Shock Tower



This rear shock tower has new "race-treated" shock-mounting locations for RPM's narrow-chassis rear-end kit, and specifically for RPM's molded chassis that uses the narrow rear-end kit. The tower is made of the same green fiberglass as the stock unit, but it has mounting holes for the no. 7034 rear bulkhead and a body-mounting tab for the Losi SE body that's recommended for the no. 8080 molded chassis.

Part no. 8023
Price: $5.50
RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (714) 393-0366.

TEAM A&L
Intercepter Body for the Traxxas TRX-1

Because the Intercepter fits so snugly on the chassis, it keeps dirt out! Molded side dams help to keep dirt away from the rear shocks, and molded air scoops can be cut to allow cool air to reach the speed controller and the motor. Each body comes with an unpainted Concept wing.

Part no. 9506
Price: $12.95

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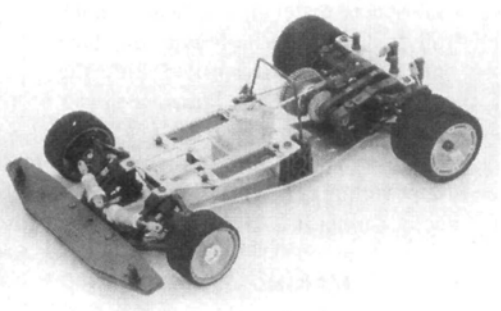
RACER'S CHOICE
BMT 931



The new BMT 931 1/10-scale on-road racing car includes almost all the features of its big brother, the two-time world champion 1/8-scale BMT 891—easy-to-adjust camber, toe-in/out, track ride height, a low-friction drive-belt system, inboard disk brakes and BMT's famous (and often copied) auto-correct front-caster geometric design, just to name a few. Durable? No question. Almost 80 percent of the parts are the same as those used on BMT's super-strong 1/8-scale models! The kit will include BMT's race-proven 2-speed transmission, high-quality bearings throughout and will come with a solid axle (looks hot for ovals!) or planetary-style gear differential.

Part no. BMT-931
Price: $495
Racer's Choice, 6N258 Acacia Ln., Medinah, IL 60157.

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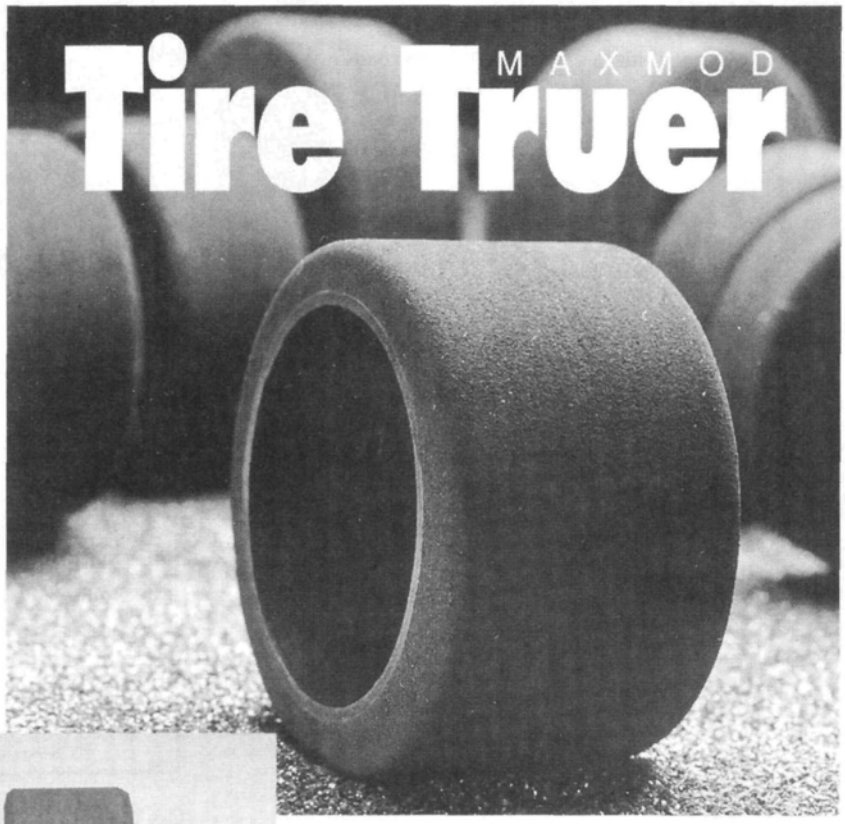
RACER NEWS

by LARRY COLE

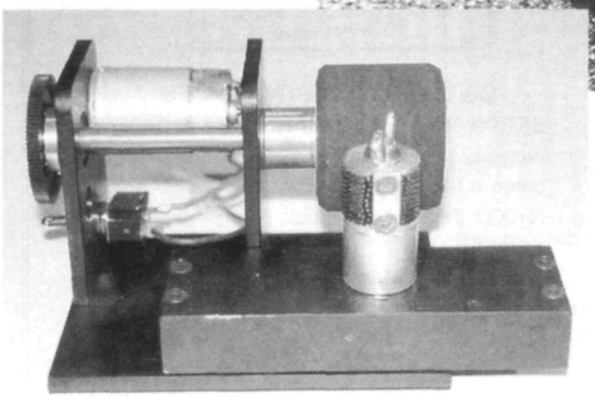
MAXMOD Tire Truer



WHEN YOU WALK down the aisles of a supermarket, you can be overwhelmed by all the claims of products that are advertised as *"New and improved!"* or—the classic—*"Now even better!"*

Manufacturers in the R/C industry have also tried these tactics, so you can imagine what I thought when I saw the *new* MaxMod* Bench Racer DC Tire Truer. I wondered if it was really just a rehash of the first MaxMod tire truer, which was introduced in 1987. But it didn't take me long to find out that it wasn't.

MaxMod was one the first companies to recognize that R/Cers needed tire truers. The first truer could handle even the biggest tires, but it wasn't exactly a trackside item. It was heavy and bulky; you had to true your tires *before* leaving for the track!



The MaxMod tire truer allows you to true your tires quickly and accurately down to optimum size.

With this limitation in mind, MaxMod set out to build a portable truer that would perform as well as the bigger version.

Powered by two 6-cell battery packs or a 12V power supply, the new MaxMod Bench Racer DC truer is well-made, durable, weighs about 2 1/2 pounds and measures 6x5x4 inches. It comes with a Mabuchi .075 heavy-duty motor, full ball bearings, 48-pitch gears, an edging tool and adapters to fit both front and rear 1/12- and 1/10-scale standard wheels. MaxMod also offers adapters for wheels of other styles (Corally, off-road, etc.).

HINTS ON ASSEMBLY

Assembly is a piece of cake as long as you follow the instructions, especially at Step 3. The cutting drum is offset on the sliding bar. When mounted, it should be offset to the right. If you aren't careful here, you won't be able to make a complete pass when you cut your tires. (Trust me on this one!)

I also found that, contrary to the instructions given in Step 6, a light oil like Marvel Mystery Oil lubricates better than a heavy shock oil or diff lube. The heavier diff lube made it more difficult to slide the sanding block past the tires when cutting, while the Marvel oil made this easier and seemed to attract less tire dust (important when cleaning time comes around).

MAKING A PASS

With the unit assembled, it was time to test it. Wearing a pair of safety glasses, I started out with a TRC blue rear tire that I had just mounted.

I put the rear-wheel adapter onto the truer, set the tire and wheel assembly on the adapter and then screwed in the hold-down nut. Wanting to see whether the claims made for the MaxMod were true, I purposely set the cutting block so that it would take out a big bite at one time. A flick of the switch, and I was on my way; and in one pass, the new truer cut off more than my old one did with *two* passes! (In the past, I had to make *four* passes to trim a tire to a circumference of approximately 7 3/4 inches.)

I discovered that the wheels from my PB Sizzler weren't thick enough to be held in place by the truer's hold-down nut. I quickly solved this problem by putting a washer on the spindle *after* the tire and then installing the nut.

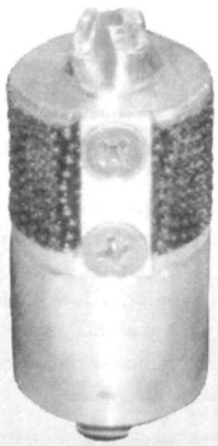
I was ready to cut the PB tires. Be careful with PB and Black Dot tires —and all tires that contain rubber—because they give off fumes when they're cut. Be sure to wear a mask to avoid breathing these fumes.

The Bench Racer didn't disappoint me; it went through the PB tire as easily as my other truer goes through a standard tire!

OUCH! THAT HURT!

Several times, after starting the motor, I whacked my hand into the moving gear and

DRAGON SKIN

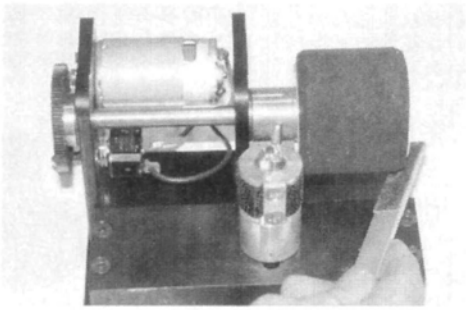


The cutter on the Bench Racer is made of "Dragon Skin"—a coarse, textured material that cuts much more effectively and more smoothly than the usual sandpaper sanding drums. If you can't find Dragon Skin at a local hardware store, you can order it directly from MaxMod, either as single sheets or in a pack of 12. You could use a standard sanding drum, but don't expect the same quality of cutting.

lost a little skin. I therefore made a guard to cover the gear.

I also discovered that using 6-cell packs for power isn't the way to go if you want to cut a bunch of tires at the same time. After cutting six tires, I noticed a drop in performance. This can easily be solved by using a 12V power supply for big tire-cutting projects (and when your friends see this truer, believe me, you'll have some *big* tire-cutting projects!).

Final analysis? The MaxMod Bench Racer is one of the best truers on the market. It's light and powerful—a terrific combination. The Bench Racer shows no signs of a loose fit or "slop," so it cuts accurately—truly a *real* truer!



Use the included edging tool to round the tires' edges and prevent them from "snagging" on the track and making the car flip over.

WHY TRUE YOUR TIRES?

- Truing is a great way to "stagger" your tires so that those on the right have a slightly larger circumference then those on the left. This will help your car to corner better on oval tracks. (Almost all oval racers do this to improve their cars' handling.)
- True foam tires to reduce their circumferences and thereby reduce "scrubbing" or "roll-out" in corners. (I've seen racers cut down their tires until there's only about ⅛ inch of tire compound left!)
- Truing helps you to save money. Rejuvenate old tires with a light pass of a tire truer; it helps to remove the "glaze" that sometimes starts to form. Tires that have been coned can be trued back to normal, and if you mount and true your own tires, you can save about $3 to $5 a pair. You can also use your truer to see whether the new tires you just bought really are "pre-trued"!

**Here's the address of the company featured in this article:*
MaxMod Mini Sports, *845-AW Olive Ave., Monrovia, CA 91016.* ■

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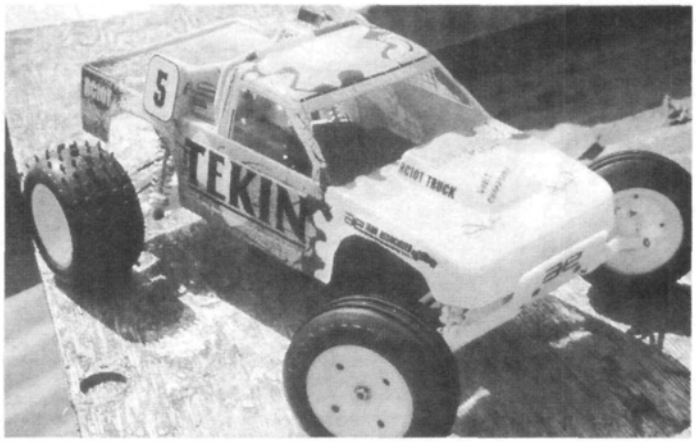
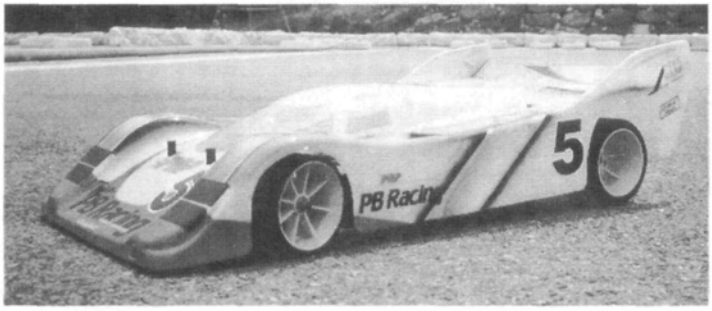


CONCOURS WINNER

Eric Morales Snyder of Puerto Nuevo, PR, painted this body himself, and it netted him a first place in concours in Cidra, PR. His RC10T is controlled by a KO Propo EX-5 radio and a Tekin 411P ESC, and it's powered by a Peak Performance Animal motor.



SACRE BLEU!

Pierre Filloux of Sainte Foy Les Lyon, France, offers this shot of his PB Sizzler. It sports an LRP motor, a battery pack and an ESC, and it's controlled by a Futaba Megatech PCM radio. Pierre's ride is topped off by a Bolink 962 Porsche body painted by PRP #1 Racing Graphics. The Ayatollah of Radio Controlla is impressed.

LIVIN' LARGE

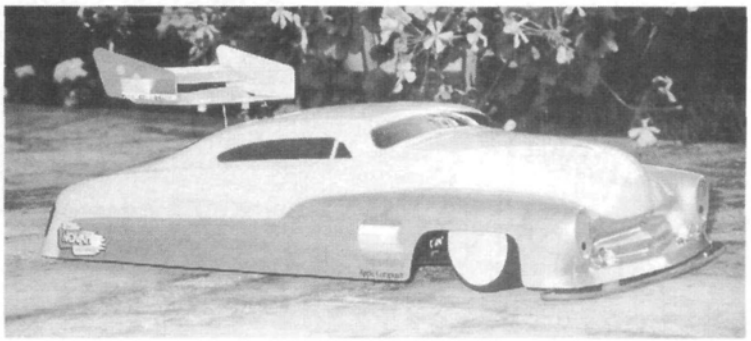
John-Paul Turanski, of Santa Rosa, CA, loves his new MRC Thunder King. With two DuraTrax 17 triples, a Trinity P170 battery pack, a Bud's wing, ball bearings and a Novak 410 MXc and FM receiver, John-Paul claims that the King is very fast and handles well on rough terrain.

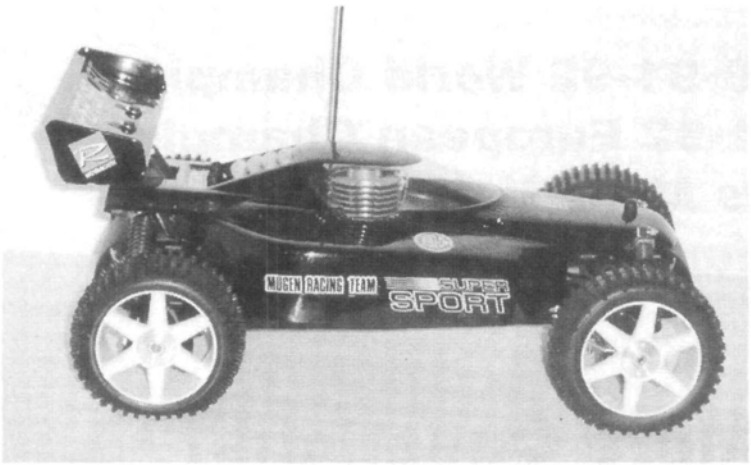
DRAG KING

Not only is Mike Russo's top-fuel dragster an exact replica of Joe Amato's full-scale ride, but it's also a record-holder in its own right at Drag City, Colton, CA; in the 14-cell class, it ran 1.89 ET/66.8mph. It sports an Astro Flight Top Fuel II motor, Stealth 1000 SCRs, an Andy's body, Robinson Stealth gears, Boca bearings, CKW tires and Futaba electronics.

SUPERSPEEDWAY SNAKE

Greg Johnson, of Pontiac, IL, is the proud owner of this Cobra SS with a McAllister '51 Mercury body. Greg has added PSE wheels and tires, an S&K Ironman Stock motor, Team Smooth batteries, True Turn axles and hubs and a Bud's Mini bi-level wing. It's controlled by a Futaba Magnum Jr. radio and has a Novak 410-M5 ESC and an NER-2X receiver.



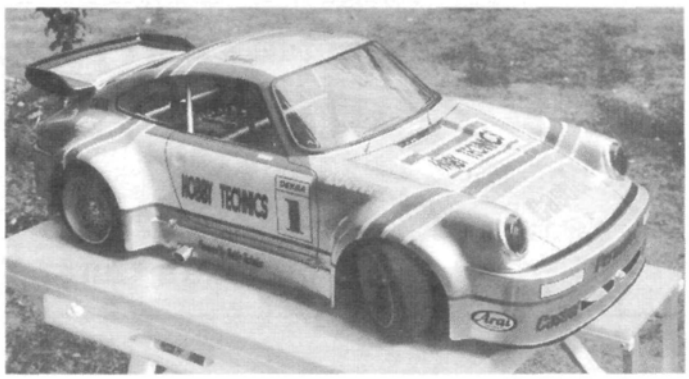


URBAN MUGEN

This Mugen Super Sport '92 is equipped with a Nova Rossi 2000 engine and a Mugen muffler, and it's controlled by a Futaba 2PD Magnum. James Corvino, of Brooklyn, NY, says, "It's very fast and rides great." Looks good, too.

¼-SCALE PORSCHE

From Herenthout, Belgium, comes a Yankee Porsche 930 Turbo with a Castrol Racing Team paint scheme. Paul Davidon uses a Futaba Field Force 3 radio with an S9302 Futaba servo for the gas and brake and two Multiplex Pro servos for steering. The car is powered by a Zenoah Black Power 22cc engine and the exhaust pipe is custom-made of brass. Paul says, "After one season of racing, car and pilot are still healthy."



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HONDA NSX

(Continued from page 72)

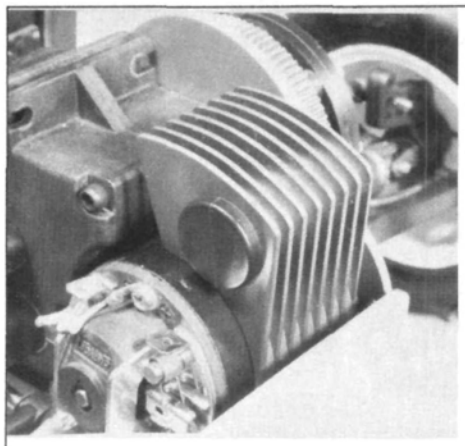
drive-belt system, for speed, this car can only be matched by a 1/10-scale, direct-drive, on-road pan car such as the Associated RC10L. The power supplied by the Peak Performance 40-degree stock motor, the PTI 1400 SCRs and the Tekin 610-R was enough to raise my blood pressure, and it gave more than 10 minutes of run time.

The car comes with a 4.25:1 gear ratio that will accept a mild modified motor. Because of its lightness and low-friction drive system, however, with a competition stock motor, the car will have more than enough tire-burning speed without sacrificing run time.

The car's handling is superb. Its mid-engine design and independent suspension makes it feel well-balanced, and the tires all stay on the ground no matter how hard you corner. In fact, on asphalt, it was practically impossible to get this car to spin out.

The phrase "All show and no go" certainly doesn't apply to the Yokomo NSX. This fun-to-drive, high-performance R/C race car performs well on or off the track, and its true-to-scale body details show its quality. If you're looking for an high-performance R/C car with the feel of the "real thing," the Yokomo NSX is more than you could ask for.

**Here are the addresses of the companies mentioned in this article:*
***Yokomo**; distributed by Competition Imports, 2691 Viscount Way, Unit 101, Richmond, BC, Canada V6V 1M9.*
***Associated Electrics Inc.**, 3585 Cadillac Ave., Costa Mesa, CA 92626.*
***Tekin Electronics**, 940 Calle Negocio #140, San Clemente, CA 92673.*
***Peak Performance**, 4245 Northwest 114th Ave., Sunrise, FL 33323.*
***PTI**, P.O. Box 4648, Winston-Salem, NC 27115.*
***Airtronics Inc.**, 11 Autry, Irvine, CA 92718.* ■



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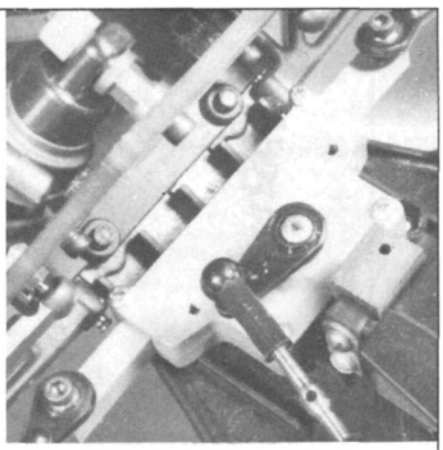

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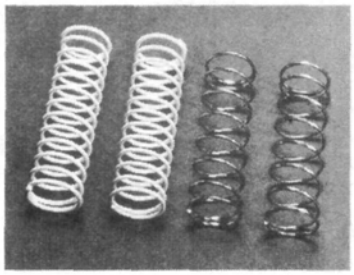


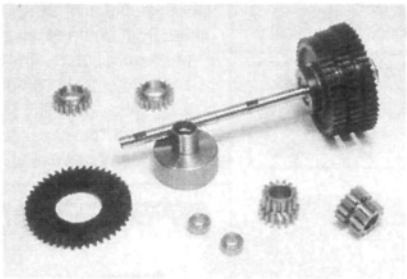
RPM
"Worlds" Front Springs

These springs were designed for the Associated 1.02 shocks that RPM recommends for its "Worlds" front-end kit. The silver springs are a little softer than Associated's blue springs. The yellow springs are even softer (good for most tracks) and are the same as Associated's long green springs with three coils cut off.

Part no. 8027 (medium); 8029 (soft).

Price: $1.50/pair.

RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (714) 393-0366.



SIGMA TRADING
Parsec 3-Speed Conversion

This gas-car conversion set has all you need to convert the Parsec Sigma NC4 (without modification). It will work with any .21 engine used for ⅛- or ⅒-scale competition. It fits most Serpent cars and weighs slightly more than a 2-speed. It has a light, screw-on pinion-gear assembly that's easy to maintain. It comes with enough gears to provide eight ratios, so serious racers can tailor their gearboxes to the track.

Part no. 1700

Sigma Trading Co., P.O. Box 51589, New Berlin, WI 53151; (414) 789-1288.

VANTAGE ENGINEERING
Banshee 24

These ROAR-legal stock motors are based on the split-armature-style motor. After a low-voltage break-in, they're tested on a dyno to give information on amp draw, rpm and power. This information—and the supplied "inch-gear" charts—allows you to optimize your gearing and get maximum performance from each motor. Tips on improving performance through proper selection of brushes and springs are also included.

Vantage Engineering, 681 Main St., Waltham, MA 02154; (617) 894-8694.

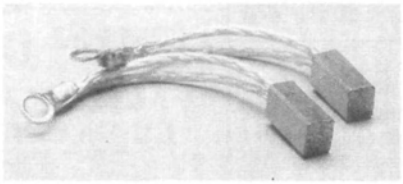
RPM
Molded Gear Cover

This gear cover clears a 93-tooth, 48-pitch gear on a Stealth tranny with a Losi Hydra Drive. It's durable, and it protects your hands from the moving parts on your transmission. This high-quality gear cover is made of white, dyeable molded nylon, and it has a "soft plug" that allows easy access to the clutch.

Part no. 7012

Price: $5.95

RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (714) 393-0366.



TRINITY
Motor Brush

This full-size, silver-content motor brush delivers high rpm and is easy on your commutator. (Its compound won't glaze or burn the commutator.) No longer will you have to cut the commutators of your oval motors after each run. It also works on stock motors to give you more runs before the commutator wears down. This brush has dual silver shunts with terminals.

Trinity Inc., 1908 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705.

PRO-LINE
1993 Narrow Bud T-Bird Superspeedway Body

Use this durable, Lexan, true-to-scale, low-profile body for superspeedway racing. Its aerodynamic design has been performance-tested and race-proven. It's a direct fit for the 10L and all other on-road chassis.

Part no. 3052 (with Bud decals); 3037 (without decals).

Price: $29.95; $19.95.

Pro-Line USA, 201 W. Lincoln St., Banning, CA, 92220; (909) 849-9781.

TAMIYA

Mercedes Benz 190E

This 1/10-scale body is in the style of the AMG-Konig/Boss Team's car that won '92's German touring car championships. Tamiya's ready-to-assemble, electric-powered version has a sophisticated, shaft-driven, 4WD chassis. For rigidity, the high-impact, injection-molded bathtub chassis/frame has a honeycomb rib pattern. Its independent, double-wishbone suspension system is damped by large-capacity, coil-over, oil-filled shocks and front and rear-sealed gearboxes with precision diffs.

Part no. 58108

Tamiya America Inc., 2 Orion, Aliso Viejo, CA 92656-2240; (714) 362-2240.

TRAXXAS

Dual-Stage Foam Air Filter

If you run your Traxxas Nitro Hawk in dust, you need this filter. It includes a reusable, foam inner filter and an outer filter. Foam pre-wraps for the stock paper-element cleaner are also available. The foam pre-wrap allows longer life from the paper filter, and it can be cleaned and reused. Made in the USA.

Part no. 3260 (foam pre-wrap); 3265 (air filter).

Traxxas Corp., 12150 Shiloh Rd. #120, Dallas, TX 75228; (214) 613-3300.

DAHM'S RACING BODIES

Pro Mask Kit

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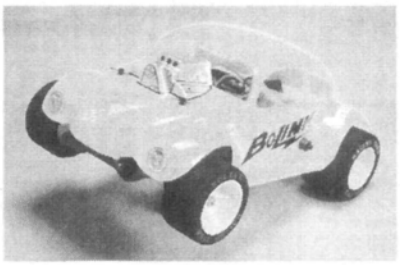
Part no. D821

Price: $6.98

Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316.



BOLINK

Digger

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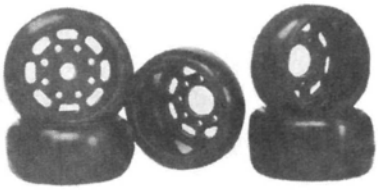
Price: $69.95

Bolink R/C Cars, 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-0252.



T.M. R/C RACING COMPONENTS

Magnum Pro-10 Radials

These wraparound capped tires are made of the rubber that's used for full-size race cars. They're available in three compounds (red, gold, silver) and three sizes, so you can vary stagger to suit the track. Light Magnum rear tires for high-banked, high-speed tracks are also available. These radials will accept T.M.'s turbo-wheel caps.

T.M. R/C Racing Components, 49679 Leona Dr., Chesterfield, MI 48051; (313) 949-3506.

PSE

Alley Cat

This hot body is a direct fit for the Schumacher Cougar. It comes equipped with a free wing.

Part no. PSE 99014

Price: $15

PSE, 13927 Progress Pkwy., N. Royalton, OH 44133; (216) 237-8658.

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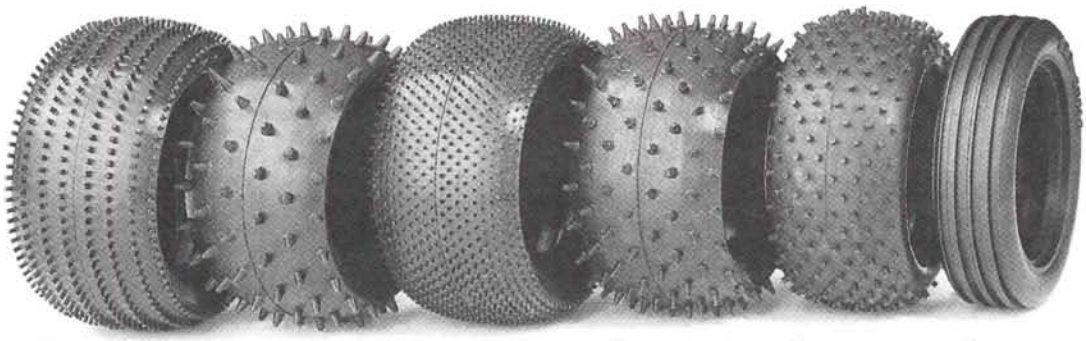
AVATAR RACING PERFORMANCE

High-Performance Offroad Tires

HOT SHOES

ALL NATURAL RUBBER !!



 # 8515 # 8333 # 8516 # 8337 # 8313 # 8111

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